

GUIDE TO

International Environmental Law

**Alexandre Kiss
Dinah Shelton**

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Law

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In Memorium **Alexandre Kiss**

(June 2, 1925–March 22, 2007)

This publication is the final scholarly work completed by Professor Alexandre Kiss before he passed away in March 2007. The Guide takes its place alongside the several dozen books and more than 400 articles authored by Professor Kiss during his lifetime. As an outgrowth of his doctoral dissertation on abuse of rights in international law, he published his first article on international environmental law in 1967 on the topic of transboundary air pollution. It appeared well before the Stockholm Conference and the emergence of environmental protection as a major international concern. From this ground-breaking article onward, Professor Kiss became an architect of international environmental law, laying its foundations, designing its structure, and participating in its construction. Through nearly half a century he was at the forefront of developing such principles as common heritage of mankind, common concern of humanity, and the rights of future generations. He helped draft some of the foremost legal instruments in the field and participated in elaborating policies and programs for the main international organizations concerned with the environment. His contributions went well beyond his scholarship, however, as he also served as a teacher, mentor, and inspiration to countless students and environmental activists around the world. His joy, dedication, and enthusiasm knew no bounds, nor did his generosity and good will. The hundreds of messages sent in remembrance of him attest to the fact that he was not only respected and revered for his intellectual gifts, he was deservedly beloved for his warmth, good humor, and concern for all components of Creation.

Table of Contents

<i>Foreword</i>	<i>ix</i>
<i>About the Authors</i>	<i>xi</i>
<i>List of Abbreviations</i>	<i>xiii</i>
Chapter I. Introduction to International Law	1
A. The Foundations of International Law	1
B. Sources: What Is International Law?	3
1. Treaties	3
2. Customary International Law	8
3. General Principles of Law	8
4. “Soft Law”	8
C. Some Basic Principles of International Law	11
1. Sovereignty	11
2. Cooperation	12
3. Common Concern of Humanity	13
4. Common Heritage of Mankind	15
D. The Relationship Between International Law and Domestic Law	16
E. Making International Law Work: Compliance and Enforcement	18
1. State Responsibility	19
2. Strict Liability	23
Chapter II. The Development of International Environmental Law	31
A. The Beginnings to the Stockholm Conference	32
B. From Stockholm to Rio	37
C. The Impact of the Rio Conference	42
D. The World Conference on Sustainable Development (WSSD)....	44

Chapter III. International Actors and Stakeholders	47
A. States and State Authorities	47
B. International Organizations	48
1. Global Institutions	50
2. Regional Organizations	55
3. Subregional and Bilateral Organizations	62
4. International Financial Institutions	63
C. The Private Sector	65
D. Public Interest Organizations	69
Chapter IV. Multilateral Environmental Agreements	73
A. Negotiations	74
B. Structure	75
C. Common Provisions and Characteristics of MEAs	77
D. Treaty Bodies and Their Functions	79
E. Compliance Procedures	81
F. Dispute Settlement	84
1. Forum Selection	84
2. Choice of Law	86
Chapter V. Common (Customary?) Legal Principles	89
A. Substantive Principles	90
1. Prevention of Harm	90
2. Precaution	94
3. The “Polluter Pays” Principle	95
4. Sustainable Development	97
B. Principles of Process	98
1. Duty to Know	98
2. Duty to Inform and Consult	100
3. Public Participation	102
C. Equitable Principles	104
1. Intergenerational Equity	106
2. Common but Differentiated Responsibilities	107
3. Equitable Utilization of Shared Resources	108
D. Conclusions	109
Chapter VI. Common Legal Requirements and Implementing Measures	111
A. Internationally Mandated Domestic Laws and Policies	112
1. Prior Assessment of Activities	112
a. EIA	113
b. Risk Assessment	117
c. Strategic Environmental Evaluation	119

2.	Regulatory Measures	120
a.	Standard-Setting	121
b.	Restrictions and Prohibitions	123
c.	Land Use Regulation	125
d.	Licensing	126
3.	Economic Measures	127
4.	National Enforcement	135
a.	Civil Liability	136
b.	Penal Law	148
B.	Interstate Measures	149
1.	Trade Restrictions	149
2.	Prior Informed Consent Procedures	150
3.	Aid and Financial Conditionality	152

Chapter VII. The Substance of International Environmental Law

	Chapter VII. The Substance of International Environmental Law	155
A.	Freshwaters	155
1.	Overview	157
2.	General Rules	157
B.	Atmosphere, Stratosphere, and Climate	160
1.	Overview	161
2.	International Efforts to Control Air Pollution	162
3.	Stratospheric Ozone Depletion and Global Climate Change	167
a.	Ozone Depletion	167
b.	Climate Change	170
C.	Biological Diversity	176
1.	The Convention on Biological Diversity	178
2.	Other Biodiversity Treaties	182
3.	Treaties Addressing Specific Threats to Biodiversity	186
4.	Agreements Concerning Specific Species	187
D.	Marine Environment	190
1.	Historical Evolution	192
2.	UNCLOS: Rights and Duties of States in Maritime Areas	194
a.	Flag State Jurisdiction	195
b.	Port State Jurisdiction	196
c.	Coastal State Jurisdiction	196
3.	Comprehensive Regional Treaties	197
4.	Regulating Sources of Pollution	199
a.	Vessel Source Pollution	199
b.	Exploration and Exploitation of the Seabed	201
c.	Land-Based Pollution	202
d.	Emergencies	203
E.	Hazardous Substances and Wastes	206
1.	Chemicals	207

viii Guide to International Environmental Law

2. Wastes 210
3. Nuclear Materials 215
4. Biotechnology 220

Chapter VIII. Environmental Protection in Other Subject

Areas of International Law 225
A. Regional Economic Integration 225
 1. The European Union 225
 a. The Treaty Framework 225
 b. Institutions 227
 c. Environmental Laws in the EU 229
 i. Air Pollution 229
 ii. Freshwaters 231
 iii. Hazardous Substances and Activities 233
 iv. Noise Pollution 235
 2. Other Regional Economic Integration Efforts 236
B. Human Rights 237
C. Trade and Investment 241
 1. GATT/WTO 242
 2. NAFTA 250
D. Military Materials and Activities 253
 1. Customary and Treaty Law of Armed Conflict 254
 2. Claims for Environmental Damages in Armed Conflict 260
 3. Advisory Opinions and Judgments of the International
 Court of Justice 266
 4. Environmental Security and Conflict Prevention 267

Conclusions 271

Appendix A: Select Bibliography and Internet Sites 275

Appendix B: Multilateral Environmental Agreements 279

Appendix C: Glossary 291

Index 303

Foreword

Since the middle of the 20th century, environmental protection has become a major concern throughout the world. Air pollution, lack of safe drinking water, trade in and disposal of hazardous products and wastes, soil erosion, global climate change, and loss of biodiversity have generated widespread demands for preventive and remedial action to ensure that natural conditions remain conducive to life and to human well-being. Policymakers responding to these demands have increasingly recognized that environmental protection must be addressed in a holistic and expansive manner. Local problems cannot be separated from national, regional, or even global conditions. As a result, the interface of international and domestic (both national and local) environmental law is rapidly expanding.

Such an evolution corresponds to the physical reality of a biosphere composed of interdependent elements that do not recognize political boundaries. These elements are impacted by human activities, which themselves are increasingly transnational. Internationalization of markets and the emergence of a global civil society have presented new opportunities as well as new challenges. Communication networks make possible more rapid knowledge of the existence and scope of environmental problems, but the widespread movement of persons and products may also contribute to those problems, for example, through the introduction of alien species and the spread of pollutants. Over-consumption threatens to exhaust living and non-living resources, while rising greenhouse gas emissions detrimentally modify the global climate. Population concentrations strain resources and create levels of pollution beyond the earth's assimilative capacity. New problems resulting from technology and changes in the nature or scope of human activities are constantly being identified, such as the potential risks of utilizing genetically modified organisms, extending industrial fish- and crustacean-farming, and introducing unprocessed endocrine-disrupting pharmaceuticals into fresh water. As a consequence, there is a constant need to develop and revise the international and national legal framework.

The aim of environmental law is to reduce the anthropogenic sources of environmental harm by modifying human behavior. Environmental law potentially reaches all human activities and falls within the domain of every

governmental institution and level of lawmaking. Other characteristics of environmental law enhance the likelihood of a jurisdictional multiplicity across institutions and venues. First, unlike most international law, environmental regulation addresses the conduct of non-state as well as state actors. Many of the former, at least, are engaged in activities in multiple locales around the world. Second, environmental problems, even more than economic activities, reveal the interdependence of states and peoples. No state, however powerful, can protect its environment without trans-border cooperation. Thus, environmental protection inevitably has an international dimension.

This book aims to present the essential elements of international environmental law. It is addressed primarily to environmental lawyers, but it may also be useful for those concerned with international law, environmental policy, and international relations. The book provides a general overview of why and how the international system elaborates environmental obligations and monitors compliance with them. Second, it discusses the relationship between international obligations and national and local law, with particular reference to federal systems. It indicates another interrelationship, pointing out the influence national law has on the emergence of international law as well as the growing role of international norms in the development and enforcement of national and local environmental policies. Finally, it examines the extent to which environmental protection should be and is taken into account in other regulatory frameworks, from trade law and human rights to disarmament and refugee policy. The basic knowledge provided in this book should allow the reader to undertake further research on topics of environmental regulation at the international level and to understand the implications of international environmental law for national law and policy.

The treaties and other texts mentioned are listed and grouped by topic in an appendix. In addition, a bibliography of further readings, a list of Internet sites, and glossary are provided.

About the Authors

Alexandre Kiss undertook his law studies at the University of Budapest (1943–1947), and at the University of Paris (1949–1951). His Ph.D. dissertation on “L’abus de droit en droit international” was published in Paris in 1952. He studied at the Institut d’études politiques of Paris (diploma in 1949) and the Institut des hautes études internationales de Paris (diploma in 1951). In 1950, after having attended three sessions, he received the diploma of The Hague Academy of International Law. Between 1951 and 1993, Professor Kiss worked at the French National Center for Scientific Research (CNRS), first preparing a Digest of International Law (*Répertoire de la pratique française en matière de droit international*, 7 volumes, Paris, 1960–1962) then acting as the director of different research centers in Strasbourg and in Paris (1966–1993). Between 1969 and 2002, he participated in the direction of the International Institute of Human Rights (Board member, then Secretary General between 1980 and 1991 and Vice-President between 1991 and 2002). Since 1974, he has been President of the European Council on Environmental Law. He is also board member, vice-president, or president of numerous other NGOs or scientific organizations. He has taught in Strasbourg since 1963 and given lectures, conferences, and participated in scientific meetings in many countries of the world. He has been a consultant for the United Nations Environment Program, UNESCO, UNITAR, the Council of Europe, and the European Union. He was Counsel of the Hungarian government in the Gabčíkovo-Nagymaros Project Case submitted to the International Court of Justice (decision of September 25, 1997) and later participated in the negotiations between Hungary and Slovakia as an expert. His publications include 15 books and approximately 400 articles and other texts (book reviews, notes, prefaces) in 14 languages. Professor Kiss has been awarded the Cross of Officer of the French Légion d’Honneur, the Cross of Merit of the Austrian Republic, membership in the Hungarian Academy of Sciences, Doctor Honoris Causa of the University of Leuven, Elisabeth Haub Prize, and W.E. Burhenne Prize.

Dinah Shelton received her B.A. (1967) and J.D. (1970) from the University of California, Berkeley. She also studied at the University of Edinburgh (1965–1966) and the Institut Bourguiba des Langues Vivants, Tunis (1962). She received a post-graduate fellowship from the Ford Foundation and worked at the International Institute of Human Rights in Strasbourg, France from 1970–1973 after which she was an attorney in private practice in San Francisco, California for two years. She began her teaching career in 1975 and has lectured at the University of California, Davis, Santa Clara University, Stanford University, University of California, Berkeley, University of Paris, Strasbourg University, and Notre Dame University. She is currently the Patricia Roberts Harris Research Professor of Law at the George Washington University Law School.

Professor Shelton is the author or co-author of prize-winning books including the *Encyclopedia of Genocide and Crimes against Humanity* (3 vols., Macmillan Reference, 2004); *Remedies in International Human Rights Law* (Oxford University Press, 1999, 2d. ed. 2005), which was awarded the Certificate of Merit, by the American Society of International Law in 2000; and *Protecting Human Rights in the Americas: Cases and Problems* (4th rev. ed. 1996, with T. Buergenthal), winner of the Book Prize, Inter-American Bar Association, 1982. Her most recent publication is R. Lillich, H. Hannum, J. Anaya & D. Shelton, *International Human Rights: Problems of Law, Policy and Practice* (Aspen Publishers, 2006).

In the environmental field, she has co-authored or edited numerous works including *Judges Manual of International Environmental Law* (UNEP, 2005), *Economic Globalization and Compliance with International Environmental Agreements* (Kluwer, 2003, with A. Kiss and K. Ishibashi), *European Environmental Law* (Cambridge University Press, 2d ed. 1997. (French edition 1995), and *International Environmental Law* (Transnational Publishers, 1991, 3d ed. 2004).

Professor Shelton has been a consultant to most international and regional organizations concerned with human rights or environmental protection. She was awarded the 2007 Elisabeth Haub Prize.

List of Abbreviations

ALI	American Law Institute
Art.	Article
ASEAN	Association of Southeast Asian Nations
ATCP	Antarctic Treaty Consultative Parties
ATS	Antarctic Treaty System
BAP	Best achievable protection
BAT	Best available technology
BEP	Best environmental practice
BFSP	British and Foreign State Papers
CBD	Convention on Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CDM	Clean development mechanism
CEC	Commission on Environmental Cooperation (NAFTA)
CFCs	Chlorofluorocarbons
CITES	Convention on International Trade in Endangered Species
COP	Conference of the Parties
CSD	Commission on Sustainable Development
CTE	World Trade Organization Committee on Trade and Environment
CTS	Canadian Treaty Series
DSU	Dispute Settlement Understanding
ECOSOC	United Nations Economic and Social Council
EC	European Community
ECHR	European Convention on Human Rights
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMEP	Cooperative program for the monitoring and evaluation of the long-range transmission of air pollutants

xiv Guide to International Environmental Law

EMuT	Multilateral Environmental Agreements (German looseleaf service)
ENMOD	Environmental Modification Convention
EPL	Environmental Policy and Law
ETS	European Treaty Series
EU	European Union
EYB	European Yearbook
FAO	Food and Agriculture Organization
GATT	General Agreement on Tariffs and Trade
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
IAEA	International Atomic Energy Agency
IBWC	International Boundary and Water Commission
ICAO	International Civil Aviation Organization
ICC	International Criminal Court
ICJ	International Court of Justice
ICRC	International Committee of the Red Cross
IFC	International Finance Corporation
ILC	International Law Commission
ILM	International Legal Materials
ILO	International Labor Organization
IMF	International Monetary Fund
IMO	International Maritime Organization
IPCC	Intergovernmental Panel on Climate Change
ISA	International Seabed Authority
ISO	International Organization for Standardization
ITLOS	International Tribunal on the Law of the Sea
IUCN	World Conservation Union
IWC	International Whaling Commission
Ji	Joint implementation
Kiss	Multilateral Treaties in the Field of the Environment (UNEP, 1983)
LMO	Living modified organism
LRTAP	Convention on Long-Range Transboundary Air Pollution
MARPOL	International Convention on the Prevention of Pollution by Ships
MEA	Multilateral Environmental Agreement
MIGA	Multilateral Investment Guarantee Agency
MOU	Memorandum of understanding
MOP	Meeting of parties
NAFTA	North American Free Trade Agreement
NATO	North Atlantic Treaty Organization

NGO	Non-governmental organization
NPT	Nuclear Non-Proliferation Treaty
OASTS	Organization of American States Treaty Series
OJEC	Official Journal of the European Communities
OAS	Organization of American States
OAU	Organization of African Unity
OECD	Organization of Economic Cooperation and Development
OPIC	U.S. Overseas Investment Corporation
OSCE	Organization for Security and Cooperation in Europe
PCBs	Polychlorinated biphenyls
PIC	Prior informed consent
POPs	Persistent organic pollutants
PPMs	Process and production methods
SALs	Structural adjustment loans
SEA	Strategic Environmental Assessment
SEE	Strategic Environmental Evaluation
SPS	Sanitary and Phytosanitary Agreement
TEU	Treaty on European Union
TIAS	U.S. Treaties and Other International Agreements
TOMAS	Tropospheric Ozone Management Areas
UN	United Nations
UNCC	UN Compensation Commission
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNGAOR	United Nations General Assembly Official Records
UNRIAA	United Nations Reports of International Arbitral Awards
UNTS	United Nations Treaty Series
UST	United States Treaty Series
VCLT	Vienna Convention on the Law of Treaties
VOCs	Volatile organic compounds
WHO	World Health Organization
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WWF	Worldwide Fund for Nature

Chapter I

Introduction to International Law

International environmental law is a branch of public international law. While agreements devoted to aspects of environmental protection have developed their own particularities, which are discussed throughout Chapter IV, the structures and norms of international law provide the basic legal framework for the field. Within this framework, international rules having quite varied objectives often need to be included as part of international environmental law, because they have a significant environmental impact. The first fishing treaties, for example, were primarily intended to prevent conflicts between fishermen of different nationalities and to protect local economies. Fulfillment of these objectives nonetheless fostered the concept of sustainable exploitation, permitting the maintenance and renewal of fish stocks. Similarly, norms to standardize the performance of internal combustion engines, originally adopted by the European Union in order to facilitate trade within the region, have led to cleaner technology and reductions in engine noise and the emission of noxious gases. In sum, the field of international environmental law encompasses large parts of public international law as well as being subsumed within its basic structure.

This chapter provides an introduction to the basic elements of the international legal system: whom it governs, how it is made, and how it relates to the internal laws of states. The final section addresses issues of compliance and enforcement, with further attention devoted to this topic in Chapter IV, Sections E and F.

A. THE FOUNDATIONS OF INTERNATIONAL LAW

International law was long defined as the body of binding norms governing the relations between states. If states create international law, the reverse is also true, to some extent, because international law establishes

2 Guide to International Environmental Law

the requisite characteristics of a state. International law also confers upon states unique rights and privileges denied other types of institutions and organizations. International law thus can be seen as acknowledging the reality that over millennia humankind has divided itself into almost 200 independent political and legal units, each having its own territory, population, economy, and government. The fundamental rights recognized for states are, first, legal independence from other states and, second, exclusive jurisdiction over activities within their own territory. These rights are often referred to as external sovereignty and internal sovereignty. It is primarily the lack of external sovereignty that distinguishes the component parts of federal unions from states recognized as part of the international system.

The sovereignty of states has a determinative impact on the law-making process, by implying that state consent is needed both to create international legal obligations and to invoke procedures for the settlement of international disputes. The UN Charter today has near universal acceptance and proclaims fundamental rules for the global society, but the organization has no legislative power. Other international organizations also lack law-making capacity. Thus, while international law aims to secure the cooperation of states to address common problems, from maintaining peace to protecting the environment, the resolution of such problems depends upon states recognizing the need to draft and voluntarily accept appropriate legal obligations, either by concluding treaties or by engaging in common practices that lead to the emergence of customary international rules.

The scope and content of international law is vastly greater today than it ever has been. Modern authorities agree that international law is not limited to regulating states, but it may also govern international organizations, other legal persons, and even individuals. In the *Third Restatement of the Foreign Relations Law of the United States*, international law is defined as the law that concerns “the conduct of states and of international organizations and with their relations *inter se*, as well as with some of their relations with persons, whether natural or juridical.” ALI, *Restatement of the Foreign Relations Law of the United States (Third)*, § 101 (1987). International law may create rights and obligations governing these persons and establishes procedures and institutions to monitor compliance with international norms. The modern definition is particularly important in the field of environmental protection, because most environmental harm is caused by private sector activities and not those of governments. The ability of international law to regulate non-state conduct is thus essential to achieving effective environmental protection.

While international law may regulate some of the actions of non-state actors, that law remains a product of express or implicit agreement among states. Non-state actors may and certainly do contribute to the elaboration of international texts and influence state behavior in ways that may contribute to the development of international custom, but they do not as

such make public international law. Instead, as discussed in the next section, international law regulates conduct through rules based on the consensual adoption of treaties and the development of customary international law based on state practice viewed as obligatory (*opinio juris*). Those rules normally become binding on non-state actors through their incorporation into the domestic law of states. Only rarely, and largely in the field of crimes, does international law impose direct obligations on purely private conduct.

B. SOURCES: WHAT IS INTERNATIONAL LAW?

International law is created and identified in reliance on law-making “sources” set forth in Art. 38(1) of the Statute of the International Court of Justice (ICJ), initially drafted in 1920 for its predecessor, the Permanent Court of International Justice. Although applying only to the ICJ, Art. 38 represents the authoritative listing of processes that states have identified and accepted as capable of creating rules binding on them; it remains, to date, the only such listing. It sets out, in order, general or specialized international conventions (treaties), international custom as evidence of a general practice accepted as law, and general principles of law recognized by civilized nations. Judicial decisions and doctrine are cited in Art. 38 as “subsidiary means to identify” or find international law, but neither constitutes a means by which law is directly created.

Art. 38 does not explicitly set a hierarchy among the three law-making sources, and the relationships can be complex. In general, treaties are interpreted in conformity with customary law where possible, but it is accepted that states *inter se* can modify their customary international obligations by treaty, provided the customary obligations do not constitute peremptory or fundamental norms of international law. In such an instance, the treaty provisions would be considered against international public policy and invalid. See Art. 53, Vienna Convention on the Law of Treaties (VCLT) (May 23, 1969), 1155 UNTS 331.

Current international practice also relies heavily on the diverse activities of international organizations, which can contribute to the development of a new rule of law, in particular, by adopting non-binding texts, in which member states may express approval for the emergence of new norms. Such texts play more than a nominal role in the formation of international law in general and environmental law in particular. These non-binding normative instruments are discussed below under the heading by which they are commonly known: “soft law.”

1. Treaties

Most legal obligations today derive from treaties. The VCLT defines a “treaty” as “an international agreement concluded between States in written form and governed by international law, whether embodied in a sin-

4 Guide to International Environmental Law

gle instrument or in two or more related instruments and whatever its particular designation.” VCLT, Art. 2.1(a). This definition omits all international agreements to which intergovernmental or non-governmental organizations are parties as well as agreements concluded by internal agencies not entitled to bind the state, for example port authorities or customs offices. Yet, all these entities enter into agreements intending to cooperate and apply agreed norms for environmental protection. In fact, a separate Vienna Convention, concluded in 1985, concerns treaties entered into by international organizations. It also should be noted that while the VCLT definition of treaties refers to agreements in writing, the Permanent Court of International Justice held that oral agreements may be legally binding. *Case concerning the Legal Status of Eastern Greenland (Den. v. Nor.)*, 1933 P.C.I.J. (ser. A/B) No. 53. Most importantly, the definition indicates that the question of whether or not a given text is a treaty is determined by whether or not it is governed by international law, i.e., is legally binding. This is a matter of the intent of the states concluding the agreement and concededly produces the somewhat circular notion that an instrument is a treaty if it is legally binding, and it is legally binding if it is a treaty. From state practice, however, it is clear that many international agreements are not intended to be legally binding, but to express political commitments. Failure to abide by such non-binding agreements may be considered unfriendly or a political affront, but the failure does not constitute a breach of international law.

Practice in the United States accepts the conclusion of executive agreements by the President acting within his foreign affairs powers. While these are not considered treaties for the purpose of Senate advice and consent to ratification, many of them are negotiated as legally binding treaties under international law. They may be given effect in domestic law as well, but it is not entirely clear that they constitute treaties for purposes of the Supremacy Clause (Art. VI) in all instances. In *Dames and Moore v. Regan*, 453 U.S. 654 (1981), the U.S. Supreme Court upheld and gave effect to the Algiers Accords, a presidential agreement with Iran that terminated claims of U.S. nationals against the Iranian government in exchange for the release of U.S. hostages being held in Teheran. The Court concluded that the agreement was a valid presidential action overriding existing claims in state and federal courts. Other executive agreements settling claims have been given similar preemptive effect. See, e.g., *Am. Ins. Ass’n v. Garamendi*, 539 U.S. 396 (2003), holding that “[g]enerally, . . . valid executive agreements are fit to preempt state law, just as treaties are.” The question of executive agreements involving matters other than settlement of claims or recognition of foreign governments remains open.

Until the 20th century, treaties were nearly all bilateral and mostly concerned boundaries, diplomatic relations, the high seas, shared freshwaters, trade, and extradition. The governing principle was reciprocity of obligations. The principle of reciprocity established a legal equilibrium between

the obligations accepted by one state and the advantages it obtained from the other contracting party.

Exceptions to reciprocal treaties have long existed and include bilateral and multilateral treaties to combat slavery and the slave trade, abolition of child labor and other humanitarian topics. Typically, these agreements confer benefits on individuals and not on other states parties; for this reason they are often referred to as creating unilateral obligations. Following World War II, non-reciprocal obligations enlarged still further to include the general international protection of human rights, regulations on the use of Antarctica and its surrounding seas, codes governing activities in outer space, and reaffirmation of freedom of the high seas with an obligation to safeguard the marine environment. Rules of international environmental law may be considered among the non-reciprocal obligations, as generally they do not bring immediate reciprocal advantages to contracting states when their objective is to protect species of wild plant and animal life, the oceans, the air, the soil, and the countryside. Sovereign equality is also implicated, because, e.g., states upstream on an international river are not in the same situation as those downstream. For coastal states, similarly, the general direction of winds and ocean currents may cut against the equality of the parties and diminish reciprocity in legal benefits and burdens.

Today, multilateral regulatory treaties are common, the topics governed by international law have proliferated, and non-state actors are increasingly part of the international legal system. Modern treaties often affect a state's internal laws and practices rather than directly regulating interstate relations, as was the case with earlier bilateral agreements. Describing these developments, some international jurists have posited the existence in international law of "treaty-laws," distinguished from "treaty-contracts." In its *Advisory Opinion on Reservations to the Convention on Genocide*, 1951 ICJ 15, the International Court of Justice provided support for this idea by distinguishing reciprocal treaties from conventions like the Genocide Convention in which states do not have any interests of their own; instead, "they merely have, one and all, a common interest, namely, the accomplishment of those high purposes which are the *raison d'être* of the convention." In a subsequent case, the Court said that agreements like the Genocide Convention created obligations *erga omnes*, duties owed to all states. If this is the case, it may imply that any and all states have standing to complain of violations by one of the parties, since no state is likely to suffer material injury, but all suffer legal injury due to the violation of law. In municipal law, a similar distinction is made between public law legislated in the general interest and contract law that allows parties to create private rights and duties by contract.

Treaties are normally negotiated by authorized representatives of the heads of state during negotiations that are held within an international organization or at a diplomatic conference called for the purpose. A treaty

6 Guide to International Environmental Law

text may be adopted by vote or by consensus and then opened for signature. Signature can serve several purposes. With bilateral agreements, but only rarely with multilateral agreements, it may express the consent of the state to be legally bound to the treaty. VCLT, Art. 12. More commonly, signature acts as an authentication of the text and a statement of intent to submit the treaty to the appropriate national body for ratification, i.e., formal approval by the highest authorities of the state. Once a state has signed a treaty, pending ratification, the VCLT provides that the state is obliged to refrain from acts that would defeat the object and purpose of the treaty until it makes clear its intention not to become a party. VCLT, Art. 18. Most treaties today are concluded in several “authentic” languages, which are presumed to have the same meaning. VCLT, Art. 33. UN practice makes treaties authentic in the six official languages of the organization (English, French, Spanish, Arabic, Russian and Chinese).

Once the text has been approved by the negotiating body, most agreements specify the means by which states signal their acceptance, and this is usually by ratification of it. If ratification is required, the domestic approval of the treaty must be followed by deposit of an instrument of ratification with the authority designated as the “depository,” to inform other parties to the treaty that it has been accepted. A state that has not signed the treaty and wishes to join will usually file an instrument of accession rather than ratification; there is no legal significance to the different terminology. Multilateral treaties usually specify a minimum number of ratifying states for the treaty to enter into force and become legally binding on the states parties as of that date.

In order to maximize state participation in multilateral agreements, provisions may be included allowing reservations to be entered at the time of signing, ratification, or accession. A reservation is a unilateral statement by a state that excludes or modifies the legal effect of one or more provisions of the treaty as applied by that state. VCLT, Art. 1(b). States sometimes call statements reservations when they are not, because they do not affect the legal obligations, and sometimes states will label as an “understanding” a statement that is in fact a reservation. The test is whether or not the rights or duties under the treaty are modified in any way. Many modern environmental agreements bar reservations because of the complicated package of bargains made during the negotiations. See UNCLOS, Art. 309 (Dec. 10, 1982); Convention for the Protection of the Ozone Layer, Art. 18 (Vienna, Mar. 22, 1985); Protocol on Substances that Deplete the Ozone Layer, Art. 18 (Montreal, Sept. 16, 1987), CBD, Art. 37 (Rio de Janeiro, June 5, 1992); and Protocol on Biosafety, Art. 38 (Montreal, Jan. 29, 2000). If a treaty does not contain a provision on reservations, general international law permits a state to make reservations so long as they are compatible with the object and purpose of the treaty. VCLT, Art. 19.

For treaties in force, the fundamental rule of treaty law is “*pacta sunt servanda*”—treaties that a state has accepted must be performed in good

faith. Neither the rupture of diplomatic relations nor a change of government affects the continuity of treaty obligations. As with contract law, there are nonetheless rules that govern the validity of treaties and provide legitimate excuses for non-performance by a party, including such matters as duress, impossibility of performance, fundamental change of circumstances, or material breach by another party. Armed conflict may affect the continuity of some agreements, but not those aimed at the protection of the human person or the environment.

In general, treaties are not retroactive and only apply from the moment they enter into force for a particular state. Some treaties may allow denunciation after a specified notice period, but many others are of indefinite duration. Unless otherwise stated, treaties apply to all persons and territories over which the state has jurisdiction, including aircraft, ships, and space objects. Complex issues of jurisdiction may arise where sovereignty is divided due to occupation or where sovereignty is absent, as in Antarctica.

The interpretation of a treaty is governed primarily by its text. VCLT Art. 31 is accepted as a statement of customary international law on the topic. It provides that words of a treaty are to be interpreted in good faith in accordance with their ordinary meaning in context, in light of the object and purpose of the treaty. VCLT, Art. 31. Other rules of international law and the subsequent practice of the states parties to the agreement are taken into account in establishing the parties' understanding of the meaning of terms and the object and purpose of the treaty. These have proven more important in multilateral treaty interpretation than the original intent of the drafters, which the VCLT relegates to a subsidiary role, to confirm meaning or resolve ambiguities arising through application of the primary rules of interpretation. The emphasis on the text and subsequent practice is particularly useful in giving effect to multilateral agreements, where the original intent of nearly 200 states would be extremely difficult to ascertain independently of the agreed-upon text. The intent of the parties can be more readily determined for bilateral treaties, where the drafting history found in the minutes and other documentation is less complex and contradictory.

The failure to observe a treaty is an international wrong, giving rise to state responsibility to cease the breach and make reparations for any injuries caused to another state. Domestic law, whether constitutional, statutory or case law, is no defense to failure to perform treaty obligations. Treaty enforcement traditionally was done by the injured party, which could withhold benefits under the treaty, applying the principle of reciprocity. Thus, the failure of one state to comply with the requirements of a bilateral extradition treaty could result in its treaty partner refusing to extradite in response. Trade agreements remain an area where the threat of retaliatory action is a means of deterring violations and enforcing the treaties. Where consequential harm occurs that cannot be cured by reci-

8 Guide to International Environmental Law

procal action, an injured state may assert a claim for reparations under the law of state responsibility, usually through diplomatic channels, but increasingly in international tribunals.

Since the creation of the United Nations, multilateral treaties rely less on retaliatory action in the case of breach and more on the creation of institutions and compliance mechanisms to review state compliance. Such procedures may result in publication of reports that identify failures, adoption of incentives, or other actions aimed at promoting compliance.

2. Customary International Law

The content of customary international law is found in widespread and consistent state practices, followed because the states believe the practices are legally required. State practice must be general, although it need not be universal. State practice is identified through, e.g., official government texts and statements, court decisions, laws, and diplomatic exchanges. See *Filartiga v. Pena-Irala*, 630 F.2d 876 (2d Cir. 1980). Conduct in violation of such official acts is treated as a violation of the law, not as extinguishing the custom. If a significant number of states adopt laws and official policies that lead them to act contrary to the purported rule, a new norm may emerge.

Not all state practice forms customary international law. State acts engaged in because they are convenient or polite do not give rise to custom, because the sense of legal obligation is absent. Instead, states must have a conviction that the rule is obligatory, referred to as *opinio juris*. Such *opinio juris* may be implied if state practice is general and consistent over a lengthy time.

3. General Principles of Law

General principles of law are those concepts and rules found in the major legal systems of the world and appropriate for application in international relations. Since such rules have been adopted in national law, consent to their application in international law is inferred. Thus, the International Court of Justice recognized the existence of corporations as legal persons in the *Barcelona Traction* case based on wide recognition of the personality of such business entities in modern law. *Barcelona Traction, Light and Power Company, Ltd. (Belg. v. Spain)* 1970 ICJ 3 (Feb. 5). General principles have often been used to fill in gaps in international law during interstate litigation.

4. “Soft Law”

States now often place normative statements and agreements in non-legally binding or political instruments, such as declarations, resolutions, and programs of action. These instruments, often referred to as “soft law” may

make it easier to press dissenters into conforming behavior, because states are free to use political pressure to induce others to alter their policies, although generally they cannot demand that others conform to legal norms the latter have not accepted. Non-binding commitments may be entered into precisely to reflect the will of the international community to resolve a pressing global problem over the objections of one or a few states causing the problem, while avoiding the doctrinal barrier of their lack of consent to be bound by the norm. New problems also may require innovative means of rulemaking when non-state actors are the source of the harm and target of the regulations; they generally cannot negotiate or be parties to treaties, and they are not involved in the creation of customary international law, but they have a direct interest in any legal regulation adopted. Their participation may thus be crucial to effectiveness of the law. The emergence of codes of conduct and other “soft law” in part reflects the desire to bring them into the law-making process.

Several other reasons may be adduced for the increasing use of non-legally binding instruments:

1. The statutes of most international intergovernmental organizations do not invest organs of the institution with the right to adopt binding decisions, so that they can express their will—or rather the will of their member states on specific matters—only through recommendations or other declarative acts. The recommendations may contain normative statements, but they are not binding. International conferences of states, like the Stockholm Conference on the Human Environment, often similarly result in declarations that express the conclusions of the meeting and agreed principles for future action, including statements of law. Some recommendations, such as the resolutions of the UN General Assembly concerning the prohibition of large-scale pelagic driftnet fishing, or the recommendations of the Organization for Economic Cooperation and Development concerning transboundary pollution, can become binding rules at the end of an evolution of state practice (customary law) or by repetition and incorporation in binding national and international legal instruments.
2. Multilateral conventions relating to environmental protection have created specific organs such as the Conferences of Parties, assisted by secretariats and, in some cases, by specialized bodies. The power of such organs to adopt decisions and norms that are binding for the states parties varies and is often uncertain. Legal counsels may issue opinions that have an impact but are not legally binding.
3. Non-binding texts are typically easier than treaties to negotiate quickly and amend in the light of new problems. Scientific knowledge and public awareness can be the major factors pressing for international action.

10 Guide to International Environmental Law

4. States may decide to forego the often lengthy treaty-making process to avoid domestic constitutional or political barriers. Recommendations, joint declarations, guidelines, or other common rules of conduct express their commitments, but do not necessitate formal ratification. Texts that are not subject to national ratification can take instant effect. This is the case, for instance, with the safety regulations drafted by the International Atomic Energy Agency
5. In some circumstances, the subject matter under consideration may make non-legally binding instruments more appropriate than formal agreements. The best examples are Action Plans, such as Agenda 21, adopted by the 1972 Rio Conference on Environment and Development, and the Arctic Environmental Protection Strategy. The contents set out general policy goals and guiding principles, rather than specific legal obligations capable of immediate implementation.
6. The drafting and implementation of soft law instruments more easily allows the participation of international institutions and non-state actors than does the process of treaty negotiating, which is usually formal and restricted to delegates from states. IUCN prepared the first draft of the World Charter of Nature, which was sent out by the UN General Assembly to the member states for comments, after which the Assembly adopted it on October 28, 1982. NGOs also can participate in the adoption and the monitoring of special agreements that are formally not binding, such as Memoranda of Understanding (MOUs). The Convention on the Conservation of Migratory Species of Wild Animals (Bonn, Sept. 19, 1979), for example, was complemented by several MOUs or administrative arrangements signed not only by states but also by so-called “co-operating organizations” including intergovernmental and non-governmental bodies.
7. Some non-governmental industrial, environmental, and consumer protection associations adopt norms that can be implemented as legal rules. The International Organization for Standardization (ISO), a non-governmental body founded in 1946 to promote voluntary international standards and to facilitate global trade, has adopted a number of worldwide technical standards related to the environment. The ISO is composed of over 100 national standardization bodies, one from each represented country. Although ISO is an NGO, most national bodies participating in it are public agencies, giving it a mixed character.

In sum, non-binding rules have the necessary flexibility to enable the international community to approach problems requiring international cooperation, such as the protection of migratory species, or to address new matters, like promoting sustainable energy sources. Parallel to this evolution, it may be noted that national authorities also make use of non-binding or voluntary agreements with private parties, such as industrial associations, forest or other landowners, indigenous groups, or scientific

institutions. These non-binding instruments can involve scientific research, land use, or reduction of pollution.

While non-binding international agreements sometimes are criticized as ineffective, compliance with such instruments may reach high rates. Different factors affect compliance with non-binding norms, just as they affect compliance with binding ones. Compliance may be enhanced by the presence of a legally binding text that provides the legal foundation for the non-binding instrument. The content or substance of the non-binding norm can assist compliance if it is sufficiently precise to allow for immediate implementation and enable the appropriate bodies to monitor compliance and to take sanctions against those who do not respect it. The involvement of regional and local authorities in compliance procedures also can be a positive factor. National authorities may foster awareness of such norms through media coverage, at all levels, involving regional and local authorities as well as civil society.

C. SOME BASIC PRINCIPLES OF INTERNATIONAL LAW

International law rests on several foundational principles, some of which have particular importance for the development of international environmental law. The UN Charter in Article 2 sets forth those principles deemed to be of constitutional importance to the United Nations and its member states: sovereign equality; good faith compliance with agreements to which a state is a party; cooperation in addressing matters of international concern; non-interference in the domestic affairs of states; and peaceful settlement of international disputes. Key to all of these principles is the concept of state sovereignty.

1. Sovereignty

State sovereignty, one of the oldest principles of international law, means that each state has exclusive legislative, judicial, and executive jurisdiction over activities on its territory. Sovereignty is exercised subject to international law, however, and is not absolute. States may enact or accept limits on their own freedom of action in order to protect common interests or the interests of other states.

Treaties to which a state becomes a contracting party result in self-imposed limits on sovereignty. In recent decades, states have concluded a large number of environmental treaties containing obligations that must be executed on their territories, including agreements to protect species of wild fauna and flora, prohibit the dumping of harmful substances into rivers, lakes or the sea, and prevent atmospheric pollution. As a consequence, states are obliged to exercise broad control over public and private activities, and this necessarily places legal limits their freedom of action.

12 Guide to International Environmental Law

The sovereign rights of states include exclusive jurisdiction over their resources. Principle 21 of the Stockholm Declaration, adopted in 1972, explicitly applies this principle to environmental matters by affirming that “[s]tates have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies.” On the Stockholm Conference and Declaration, see Chapter II, Section A. Two decades later, the Rio Declaration modified this language by referring to “environmental *and developmental* policies.” See Chapter II, Section B. It is thus up to each state, subject to its treaty and customary obligations, to determine the level of environmental protection it aims to achieve.

Exploitation of a state’s resources has the potential to infringe the sovereignty of other states due to transfrontier environmental impacts; in addition, many species of wild animals, birds, and fish migrate across boundaries, threatening to create interstate disputes over rights to them. Avoiding conflict and managing these resources requires international law. Hence, the Stockholm Declaration and other international texts balance state sovereignty with “the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.” The duty to prevent extra-territorial environmental harm and the corresponding law of state responsibility are further discussed at Section E.

2. Cooperation

An obligation to cooperate with other states emerges from the very rationale for international law and finds reflection in the proliferation of international agreements and institutions. In the field of environmental protection, equitable use of shared resources, such as transboundary watercourses and international lakes, especially depends upon international cooperation. The general need to cooperate to conserve the environment is expressed in several non-binding texts, starting with Principle 24 of the Stockholm Declaration. Several UN General Assembly resolutions, the 1982 World Charter for Nature, and the Rio Declaration on Environment and Development also refer to it.

The principle of cooperation underlies all treaty obligations, but several texts specify the aims of state cooperation. Article 197 of the 1982 Convention on the Law of the Sea is an example:

States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features.

Similarly, Principle 5 of the Rio Declaration calls for cooperation to eradicate poverty. Principle 27 adds that cooperation shall be conducted in good faith and shall include further development of international law in the field of sustainable development. Specific duties of cooperation apply to the transnational transfer of activities and substances that cause severe environmental degradation or are harmful to human health. See Rio Declaration, Principle 14, and the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, Mar. 22, 1989).

Environmental treaties and other texts frequently call for cooperation in the transfer of funds, knowledge, information, and technology, to assist developing countries to comply with their treaty obligations or more generally to achieve sustainable development. See 1992 UN Framework Convention on Climate Change, Art. 4(5); Convention on Biological Diversity, Art. 20(2); Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, Arts. 20 and 21 (June 17, 1994).

An order on provisional measures issued December 3, 2001, by the International Tribunal on the Law of the Sea in the *Mox Case (Ireland v. U.K.)* indicates that the duty to cooperate may be legally enforceable. Ireland invoked UNCLOS Art. 123, which requires states to cooperate in exercising their rights and performing their duties with regard to enclosed or semi-enclosed seas, in this case the Irish Sea. Ireland also relied upon UNCLOS Article 206, which requires prior assessment of planned activities that may cause substantial pollution or significant and harmful changes to the environment. The Court, in paragraph 82 of its order, concluded that UNCLOS and general international law make the duty to cooperate a fundamental principle for the prevention of marine pollution and that rights arise therefrom, which the tribunal may preserve through ordering provisional measures. *Mox Plant Case (Ire. v. U.K.)*, ITLOS, Dec. 3, 2001, 41 ILM 405 (2002).

3. Common Concern of Humanity

The cohesion of every society is based upon and maintained by a value system. The system may demand respect for the human person, propriety, patriotism, cultural values, or a particular social order. The protection of such fundamental values is generally recognized as a common concern of the community and is ensured through law, especially constitutional law.

During the second half of the 20th century states created an international political organization to maintain international peace and security and improve human well-being. This ambitious effort led to identifying defining domains of common concern. The international recognition of human rights and fundamental freedoms was a first step in developing the concept of an international community built upon the fundamental val-

ues of humanity. Similarly if somewhat later, protection of the human environment became accepted as a common concern of humanity. The ecological processes of the biosphere, such as climate change, necessitate protection at the global level, while transboundary and many domestic environmental issues cannot be managed effectively by national efforts alone. The modalities of protection and preservation are formulated in international law and policy and enforced by national and international institutions.

The term “common interest” appeared early in international treaties concerning the exploitation of natural resources. The preamble to the International Convention for the Regulation of Whaling (Washington, Dec. 2, 1946) recognizes the “interest of the world in safeguarding for future generations the great natural resources represented by the whale stocks” adding that “it is in the common interest” to achieve the optimum level of whale stocks as rapidly as possible. The Convention for the High Seas Fisheries of the North Pacific Ocean (Tokyo, May 9, 1952) expresses the conviction of the parties that it will best serve the common interest of mankind, as well as the interests of the contracting parties, to ensure the maximum sustained productivity of the fishery resources of the North Pacific Ocean. Other examples include the Convention on Biological Diversity (1992) (“affirming that the conservation of biological diversity is a common concern of humankind”) and the UN Framework Convention on Climate Change (“change in the Earth’s climate and its adverse effects are a common concern of humankind”).

The international concept of common concern does not connote specific rules and obligations, but establishes the general legal basis for the concerned community to act. Designating a matter as one of common concern removes the topic from states’ exclusive domestic jurisdiction and makes it a legitimate matter for international regulation. The conventions cited above thus imply a global responsibility to conserve disappearing or diminishing wild fauna and flora, ecosystems, and natural resources in danger.

The right and duty of the international community to act in matters of common concern still must be balanced with respect for sovereignty. States retain exclusive jurisdiction subject to the obligations international law creates to assure the common interest.

Respect for human rights, economic development, and environmental protection have been unified in the concept of sustainable development as a common concern of humanity. Other domains of international law, such as international trade, are instrumental in achieving the common interest but they are not themselves among the ultimate goals of international society. Instead, they are means to achieve the well-being of humanity as a whole. The terms of the UN Charter indicate that international peace and security, together with economic and social advancement of all peoples and individuals, are also necessary to ensure the overall advancement of humanity.

The notion of common interests shared by the international community may have procedural implications. In traditional international law, only an injured state could bring a claim against the state which caused the injury in violation of international law. Where the common interest is infringed, however, all states may be considered to have suffered a legal injury, with the obligations designated as obligations owing to all states, i.e., as obligations *erga omnes*. In the *Barcelona Traction, Light and Power Company, Limited Case (Belg. v. Spain, Second Phase)* 1970 ICJ 4, 32, the International Court of Justice recognized the distinction between different kinds of norms:

[A]n essential distinction should be drawn between the obligations of a State towards the international community as a whole, and those arising vis-a-vis another State in the field of diplomatic protection. By their very nature the former are the concern of all States. In view of the importance of the rights involved, all States can be held to have a legal interest in their protection; they are obligations *erga omnes*.

The Court included, in the category of obligations *erga omnes*, the international laws prohibiting aggression, genocide, slavery and racial discrimination. More recently, the International Court of Justice has cited with approval the view of the International Law Commission that safeguarding the earth's ecological balance has come to be considered an essential interest of all states, as it aims to protect the international community as a whole. See *Case Concerning the Gabčíkovo-Nagymaros Project (Hung. v. Slovakia)*, 1997 ICJ 7, para. 53 (Sept. 25), citing the International Law Commission, Commentary to Art. 33 of the Draft Articles on the International Responsibility of States, [1980] 2 (Part 2) Y.B. Int'l L. Comm'n 39, para. 14. Thus, some of the codified norms and customary standards in the environmental field may be viewed as obligations *erga omnes*.

4. Common Heritage of Mankind

The common heritage of mankind is a controversial concept that emerged at the end of the 1960s to challenge older concepts of *res nullius* and *res communis* as a legal approach to regulating the use of common resources. *Res nullius*, which in many legal systems includes wild animals and plants, belongs to no one and can be freely used and appropriated when taken or captured. The designation of *res communis* implies the reverse, common ownership that precludes individual appropriation but allows use of the resources, e.g., navigation on the high seas. The concept of common heritage of mankind is distinct from both earlier concepts, in part because of its inclusion of the word "heritage," connoting a temporal aspect in the communal safeguarding of areas legally incapable of national appropriation. In part based on this concept, special legal regimes have been cre-

ated for the deep seabed and its subsoil, Antarctica, and the Moon.

The nature of the common heritage is a form of trust whose principal aims are exclusive use for peaceful purposes, rational utilization in a spirit of conservation, good management or wise use, and transmission to future generations. Benefits of the common heritage may be shared in the present through equitable allocation of revenue, but this is not the essential feature of the concept. Benefit-sharing can also mean sharing scientific knowledge acquired in common heritage areas, and is applied to activities in Antarctica or on the Moon.

D. THE RELATIONSHIP BETWEEN INTERNATIONAL AND DOMESTIC LAW

International law is binding at the international level, and it is no defense to breach of an international obligation that a state's domestic law differs or that the government of the state has failed to give effect to the international norm. VCLT, Arts. 27, 46. Breach of an international obligation, whether based on a treaty or customary international law, gives rise to certain automatic consequences, the first of which is an obligation to cease the breach and conform conduct to the law. See *LaGrand Case (Ger. v. U.S.)*, 2001 ICJ (June 27), 40 ILM 1069 (2001).

On the national level, the place of international law varies from one legal system to another. In the United States, treaties are listed as part of the "supreme law of the land" in Art. VI of the Constitution. This means that they override conflicting laws, including constitutional laws, of the component states in the federal system. *Asakura v. Seattle*, 265 U.S. 332 (1924). The U.S. Supreme Court has long applied two important doctrines in considering the role of treaties in U.S. law. The first is that treaties are legally equivalent to a federal statute and thus the later in time will prevail in case of a conflict. The second doctrine is that whenever possible, federal statutes will be interpreted to conform to the international legal obligations of the United States. *Murray v. The Schooner Charming Betsy*, 6 U.S. (2 Cranch) 64, 118 (1804).

Treaties in force are not always judicially enforceable and do not always create private rights of action. A "self-executing" treaty is automatically part of domestic law and enforceable by courts, but treaties that require further legislation to implement them are non-self-executing and are therefore not justiciable until implementing legislation has been adopted. Courts look to the intent of the parties and to the language of the agreement to make the determination. See *Foster v. Nielson*, 27 U.S. (2 Pet.) 253, 314 (1829).

The role of customary international law in the U.S. legal system is not explicitly addressed in the Constitution. The U.S. Supreme Court determined that it is, however, part of U.S. law, declaring that "it must be ascer-

tained and administered by the courts of justice of appropriate jurisdiction, as often as questions of right depending upon it are duly presented for their determination.” *The Paquete Habana*, 175 U.S. 677 (1900). The exact role of customary international law and its place in the U.S. legal system are debated issues, because there are few cases on point.

Even where treaties and custom are not the primary basis for judicial decisions, they can be influential in a case. A recent example is *United States v. Locke*, 529 U.S. 89 (2000). A trade association of oil tanker operators, representing some 80 percent of the world’s independently owned tanker fleet, brought suit seeking declaratory and injunctive relief against the state of Washington. The state had enacted regulations requiring “the best achievable protection” (BAP) from oil spill damages in the Puget Sound and imposed standards that were more stringent than those adopted by the U.S. Congress, including some governing tanker operation and design. The U.S. Supreme Court held that the state actions were preempted and that only the federal government may regulate the design, construction, and other aspects of tanker vessels. While the Court relied primarily on the Ports and Waterways Safety Act, 33 U.S.C.A. § 1223 et seq., it also considered arguments that the BAP standards countered important foreign affairs interests of the federal government and cited maritime treaties to which the United States is a party. The Court agreed that the goal of national governments to develop effective international environmental and safety standards would be defeated by allowing local authorities to impose differing regulatory regimes. It noted that the scheme of regulation includes “a significant and intricate complex of international treaties and maritime agreements bearing on the licensing and operation of vessels and that this regime depends upon the principle of reciprocity.” Thus, although the case rested on statutory preemption, the treaty regime lay behind the statutes and provided the context for the decision.

Those who reside in federal legal systems are familiar with the problems that arise when social issues are regulated at multiple levels of governance and among different institutions at the same level (vertical and horizontal divisions). In the best of circumstances, local, regional, and national regulation can reinforce and complement each other without duplication of effort and wasted resources. Yet, this ideal is rarely achieved, and even when there has been rational allocation of lawmaking, complex questions of jurisdiction, forum, and choice of law arise on a regular basis over matters of enforcement and dispute settlement. It should not be surprising, therefore, to see similar difficulties arise at the international level, given multiple sources of environmental regulation and the proliferation of national, regional, and global institutions.

Traditional notions of sovereignty call for reserving the maximum flexibility to national institutions to develop their own national or local policies, even while implementing and enforcing international environmental

law. This is especially warranted under international agreements that set only broad policies and goals, and it is reflected in Principle 21 of the Stockholm Declaration on the Human Environment, which affirms the sovereign right of states to develop laws and policies concerning resource use, provided the state does not cause harm extra-territorially. Doctrines like the European “margin of appreciation” involve considerable deference to national decisionmaking subject to some international supervision. For the latter, international proceedings are crucial. Some of these are discussed in the next section. International bodies specifically concerned with the environment are described in Chapter III.

E. MAKING INTERNATIONAL LAW WORK: COMPLIANCE AND ENFORCEMENT

Ensuring compliance with international treaties and custom is one of the main issues in international law. In a society composed of sovereign states that have exclusive jurisdiction over their territory, including maritime areas and an air space, compliance with obligations that the states have accepted raises specific problems that increase when environmental matters are in question. First, most environmental problems initially arise within the limits of national jurisdiction and do not immediately and directly harm other states, so the latter cannot file claims for reparations unless the obligations are designated as ones owed *erga omnes*. One may think of the use of CFCs, the emission of greenhouse gases, or the destruction of biological diversity. In such instances, the normal sanction in treaty law, which consists in other states withholding equivalent treaty benefits from the breaching party, also cannot be used, and other types of non-compliance consequences must be foreseen.

Secondly, violations of MEAs are most often committed by non-state actors, from individuals to large-scale industries. Governments are responsible, because they have accepted the treaty obligations, but, in practice, compliance may be difficult, because the state must commit scarce political and economic resources to ensure the required result. In many instances, the political costs of enforcing national and international law on the private sector may be higher than when the state regulates its own activities. States have various direct sanctions available to control the behavior of state agents, from disciplinary measures to dismissal. The regulation of non-state behavior, however, is likely to require legislation that may be difficult to adopt when the non-state actors play a powerful role in the domestic political arena. This is a key factor in the environmental field. Where there are costs imposed on industries that have a high degree of political influence, the state may find it difficult to ensure compliance. Both the will and capacity of the state to comply can become compromised.

1. State Responsibility

In international law, the law of state responsibility determines the consequences of a state's failure to comply with its international obligations. In general, it requires a state that breaches an international obligation to cease the violation and provide reparations for any harm caused to another state. This responsibility based on fault may be distinguished from imposition of liability for the deleterious effects of lawful acts, that is, liability without fault. In environmental law, the latter concept can be seen as an application of the polluter pays principle, requiring that the operator or actor who benefits from a lawful activity bear the risk of loss when harm is done to others. Such imposition of strict liability is rare, as detailed in Section E.

According to international law, states are responsible for international law violations that can be attributed to them. In August 2001, the International Law Commission completed its Draft Articles on the Responsibility of States for Internationally Wrongful Acts, which the UN General Assembly "took note of" in Resolution 56/83 (Dec. 2001). According to Art. 2 of the Draft Articles, a state commits an international wrong when an act or omission attributable to it constitutes a breach of an international obligation of the state. Art. 3 adds that the characterization of an act of a state as internationally wrongful is governed by international law. In other words the primary rules of conduct for states, i.e., their rights and duties, establish whether an act or omission constitutes a wrongful act. At present, as discussed in the next section, only a handful of treaties make states strictly liable for any harm that occurs in another state's territory as a result of specific activities, even if the state has otherwise complied with its legal obligations. The large majority of multilateral environmental treaties focus not on the harm to the injured state, but on the conduct of the acting state, imposing duties of comportment and of result.

Although traditional norms of state responsibility most frequently concern the treatment of aliens and their property, the *Trail Smelter* arbitration of 1941, recognized that principles of state responsibility are applicable in the field of transfrontier pollution, and consequently states may be held liable to private parties or other states for pollution that causes significant damage to persons or property. The UN Survey of International Law, a few years later, concluded that there is "general recognition of the rule that a State must not permit the use of its territory for purposes injurious to the interests of other States in a manner contrary to international law." UN Doc. A/CN.4/1/Rev.1 (UN Pub. 1948. V.1(1)), at 34 (1949).

The principle of state responsibility for transboundary environmental harm is contained in numerous international texts. Principle 21 of the Stockholm Declaration declares that states have the responsibility to ensure

that activities under their jurisdiction or control do not cause damage to the environment of other states or to areas beyond national jurisdiction and refers to responsibility for transfrontier pollution in Principle 22. The rule was reiterated in Principle 2 of the 1992 Rio Declaration and was again confirmed at the 2002 World Summit on Sustainable Development. It has also been reaffirmed in declarations adopted by the United Nations, including the Charter of Economic Rights and Duties of States and the World Charter for Nature, and has been adopted by other international organizations and conferences. Its content is inserted in the Convention on the Law of the Sea (Art. 194(2)) as well as in the ASEAN Convention on the Conservation of Nature and Natural Resources, Art. 20 (Kuala Lumpur, July 9, 1985). The 1979 Geneva Convention on Long Range Transboundary Air Pollution reproduces Principle 21 stating that the Principle “expresses the common conviction that States have” on this matter. Principle 2 of the Rio Declaration appears in the preamble of the 1992 UN Framework Convention on Climate Change and Art. 3 of the Convention on Biological Diversity.

Finally, taking cognizance of these developments, the International Court of Justice recognized in an advisory opinion that “[t]he existence of the general obligation of states to ensure that activities within their jurisdiction and control respect the environment of other states or of areas beyond national control is now part of the corpus of international law relating to the environment.” *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, 1996 ICJ 241–42, para. 29. This statement was repeated in the judgment concerning the *Gabčíkovo-Nagymaros Project*, in which the Court also “recall[ed] that it has recently had occasion to stress . . . the great significance that it attaches to respect for the environment, not only for states but also for the whole of mankind.” *Case Concerning the Gabčíkovo Nagymaros Project (Hung. v. Slovakia)*, 1997 ICJ 7, para. 53 (Sept. 25).

In order to impose an obligation to cease a harmful activity or repair harm caused, the legal basis or degree of fault on which the obligation is premised must be determined. In general, international responsibility is founded on fault imputable to the acting state. It is necessary to show that an obligation was violated and that harm resulted from the violation; it is generally not necessary to show that the acting state specifically intended the harm to result. Fault exists if the state actor fails to perform a duty or observe a standard. Generally, the applicable international rules and standards do not hold a state responsible when it has taken necessary and practicable measures, i.e., exercised due diligence.

The law of state responsibility requires establishing a link of causality between a culpable act and the damage suffered, and the damage must not be too remote or too speculative. Pollution poses specific problems for several reasons. First, the distance separating the source from the place of damage may be dozens or even hundreds of miles, creating doubts about the causal link even where polluting activities can be identified.

Second, the noxious effects of a pollutant may not be felt until years or decades after the act. Increase in the rate of cancers as a consequence of radioactive fallout, for example, can be substantially removed in time from the polluting incident. This problem was highlighted by the 1986 Chernobyl accident, which immediately caused 29 deaths, but which directly or indirectly may have produced thousands of cases of cancer over the long term. Intervening factors may play a role as well. See Section E.2.

Third, some types of damage occur only if the pollution continues over time. This is true of the deterioration of buildings and monuments, for example, or, in certain circumstances, vegetation. Proof of causation also is made difficult by the fact that some substances cause little harm in isolation but are toxic in combination. Imputing responsibility to one source rather than another is difficult.

Fourth, the same pollutant does not always produce the same detrimental effects due to important variations in physical circumstances. Thus, dumping polluting substances in a river will not cause the same damage during times of drought as it will during periods where water levels are high. Similarly, wind or the lack of it, fog, or sunlight can modify the impact of air pollution or even the nature of pollution. Urban smog, for example, is exacerbated by atmospheric inversions (layers of warm, still air held below a cold air mass) that block elimination of the air pollutants. The latter derive from multiple sources, including industry, domestic heating, and motor vehicles. In such a situation it appears impossible to impute injury to a single precise cause in order to impose responsibility. Long-distance pollution, especially long-range air pollution, poses unique problems in identifying the author of the harm and precludes relying on traditional rules of state responsibility.

Even at a short distance, proving the identity of the polluter can pose problems. For example, gas emissions from motor vehicles are harmful, including the fumes of each individual automobile. Yet it is difficult to apply rules of responsibility and demand reparations from each driver, because the numbers are too great and the effects produced by each unit are relatively limited. Nonetheless the cumulative effects are significant due to the part played by nitrous oxide (NO₂) and burned hydrocarbons (HC) in the formation of ozone at medium altitudes during sunny periods; they are also factors in the depletion of forests. One answer is pollution or carbon taxes, discussed in Chapter VI, Section A.3.

Another issue of state responsibility concerns the extent to which states are accountable for the actions of private parties under their jurisdiction or control. As a general rule, it can be said that the state whose territory serves to support the activities causing environmental damage elsewhere or under whose control it occurs is responsible for the resulting harm. The necessary element of an act or omission by a state agent is generally present, because the large majority of domestic activities capable of causing serious environmental harm outside the country requires prior approval

22 Guide to International Environmental Law

or licensing under domestic legislation. Such approval normally will suffice to engage the responsibility of the competent territorial authority.

The issue of reparations is also difficult. In the *Chorzow Factory* case, the Permanent Court of International Justice indicated the scope and purpose of reparations in the law of state responsibility:

reparation must, in so far as possible, wipe out all the consequences of the illegal act and re-establish the situation which would, in all probability, have existed, if that act had not been committed. Restitution in kind, or, if that is not possible, payment of a sum corresponding to the value which a restitution in kind would bear, the award, if need be, of damages for loss sustained which would not be covered by restitution in kind or payment in place of it.

Chorzow Factory (Indemnity) Case, 1928 P.C.I.J. (ser. A) No. 17, at 29 (Sept. 13). Various MEAs and declarations affirm that harm to the environment requires the state of origin to restore the environment to its *status quo ante*, and that anyone who carries out the necessary remediation is entitled to reasonable reimbursement. If it is impossible to fully restore the prior conditions, which is often the case, the parties must agree on compensation. In evaluating or measuring damages, a great deal of uncertainty exists, because the elements of the environment often are not viewed as having economic value when they remain outside the marketplace. For example, there may be wide divergence in valuing seabirds killed by an oil spill or the aesthetic value of a clean coastline. In other cases, damages may be estimated according to accepted case law from other fields, including such items as lowered property values due to pollution or lost business due to smoke or noise.

The issue of diplomatic protection arises when an individual suffers harm due to activities originating in another state. According to international law, diplomatic protection is exercised by states in order to ensure respect for international law vis-à-vis their nationals. *Mavrommatis Case*, 1924 P.C.I.J. (ser. A) No. 2, at 12 (Aug. 30). In such cases, typically, the injured party is physically present in the state causing the harm, and only the state of nationality may protest the wrongful act on behalf of its national. In pollution cases, then, if the victim of such pollution is unsuccessful in obtaining redress through local remedies, the national government of the injured party may (but is not required to) take up the case. If the complaint is taken, the complainant's government will present an international claim to the government on whose territory the harmful activities have taken place.

The different circumstances of injury caused by transfrontier pollution suggest that the traditional conditions for the exercise of diplomatic protection and the usual procedures to obtain reparation may not apply. In particular, it is not clear that the victim of injury must be a national of the

state from which he claims protection. Acts of transfrontier pollution harm persons outside the boundaries of the acting state and have their effect in the victims own place of residence. Nationality is not the key element, because all who are situated on the territory or territories where the injury occurs are similarly situated and have not voluntarily subjected themselves to the jurisdiction of the state causing the injury. The claimant state can be seen as proceeding in order to protect persons within its territorial sovereignty rather than as exercising its personal competence on behalf of its citizens. Thus, an injured individual may be an alien in the state presenting the claim or even have the nationality of the accused state. In demanding reparations, the state enforces international law respecting its territory as well as in regard to its subjects.

With territory rather than nationality the usual basis for claims of state responsibility for environmental harm, diplomatic protection will maintain its traditional function only when the victims of polluting activities are found in places where the sole link between them and their state is personal: the high seas and air space above, Antarctica, outer space

Finally, it is necessary to mention the problem of abatement. One of the requirements arising from breach of a rule of international environmental law is that an activity causing significant transboundary environmental harm should cease. Where the issue is one of risk of harm, however, international law provides that lawful activities may continue, if their benefits to the state substantially outweigh the risks of transfrontier harm. In such a case, compensation still may be required if harm actually occurs through lack of due diligence. The risk-creating conduct is permitted, but the victim does not bear the burden of the injury that may result. Instead, a social responsibility is imposed upon the actor to compensate the victims for harm that occurs even though the activity is legal. Purely accidental harm, however, is a matter of the law governing strict liability and not that of state responsibility. This matter is addressed in the next section.

2. Strict Liability

While Stockholm Principle 21 and similar formulations can be read to impose absolute state responsibility for any transfrontier harm, whether intentional or accidental, states generally have not invoked it to assert claims for accidental harm, however damaging the impact. The Chernobyl incident is a case in point.¹ Following the April 26, 1986, explosion in reactor Number 4 of the Chernobyl nuclear power plant, the resulting fire melted a portion of the uranium fuel. Although there was no nuclear

¹ See L. Malone, *The Chernobyl Accident: A Case Study in International Law Regulating State Responsibility for Transboundary Nuclear Pollution*, 12 COLUM. J. ENVTL. L. 203, 222 (1987).

explosion and the core of the reactor did not melt, the fire that engulfed the reactor was serious and released a large quantity of radioactive material into the air.

Large amounts of fallout occurred near the plant and spread beyond. Between April 27 and May 8, nearly 50,000 persons were evacuated from towns located within a 30-kilometer radius of the plant. Two persons were immediately killed by the explosion, 29 died shortly after, and hundreds were afflicted with radiation poisoning. The foreign consequences were also severe, even though no deaths were immediately attributed to the accident. Following rapid changes in the wind direction, the radioactive cloud, which had formed, crossed the airspace of a series of countries beginning with those of Scandinavia. Four days after the incident, radiation measurements along the Swedish coast were ten times higher than normal. The radioactive cloud moved south, crossing Germany, Austria, Switzerland, Yugoslavia and Italy.

No conventional international regulation applied at the time of the accident. The Convention on Long-Range Transboundary Air Pollution (Geneva, Nov. 13, 1979) excluded pollution by radioactive elements. The USSR was not a contracting party to the Vienna Convention on Civil Liability for Nuclear Damage (May 21, 1963). Indeed, among the states that suffered effects from the radioactive cloud, only Yugoslavia had signed and ratified the Convention. There remained, therefore, only the recourse to general rules of international environmental law. After consideration, none of the affected states presented a claim to the Soviet Union.

Strict liability is foreseen in texts regulating activities considered as especially new or dangerous, such as the exploration and exploitation of the outer space, and that are largely conducted by state actors. The Convention on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (Jan. 27 1967), provides both for state responsibility and strict liability. First, Art. VI provides that the states parties bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, require authorization and continuing supervision by the appropriate state, thus ensuring state involvement. Art. VII of adds that each state that launches or procures the launching of an object into space and each state from whose territory or facility an object is launched, is liable to another state or to its natural or juridical persons for harm caused by such object, or its component parts, on the earth, in air space or in outer space, including the moon and other celestial bodies. Taken together, these two provisions distinguish between responsibility based on fault for incidents in outer space (Art. VI) and strict liability for the consequences to earth of space activities (Art. VII).

The Convention on International Liability for Damage Caused by Space Objects (Mar. 29, 1972) further develops the distinction and contains several details concerning implementation. According to its Art. II, a launching state is absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight. Whenever two or more states jointly launch a space object, they are jointly and severally responsible for any damage caused. A state from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching. Exoneration from strict liability is granted to the extent that a launching state establishes that the damage has resulted from another's gross negligence or from an intentional act or omission. No exoneration will be granted in cases where the damage has resulted from activities conducted by a launching state in breach of international law. Nationals of the launching state or foreign nationals participating in the launching cannot ask for compensation for damage caused by the launching state. Art. VII.

A UN General Assembly resolution proclaiming Principles Relevant to the Use of Nuclear Power Sources in Outer Space (Res. A/47/68, Feb. 23, 1993) refers to the Liability Convention in extending its scope to cover the use of nuclear power in space:

Each State which launches or procures the launching of a space object and each State from whose territory or facility a space object is launched is internationally liable for damage caused by such space objects or their component parts. This fully applies to the case of such a space object carrying a nuclear power source on board. Whenever two or more States jointly launch such an object, they shall be jointly and severally liable for any damage caused, in accordance with article V of the above-mentioned Convention.

Such provisions establish a regime of strict liability and not of responsibility.

Within the Antarctic system, efforts to conclude a liability annex to the 1991 Madrid Protocol partially succeeded in June 2005, with conclusion of a limited agreement on environmental emergencies, defined as any accidental event that takes place after the entry into force of the Annex, when the accident results in or imminently threatens significant and harmful impact on the Antarctic environment. The agreement, adopted as Annex VI to the Protocol on Environmental Protection, will enter into force once all the present Consultative Parties have ratified it.²

² Article IX of the Antarctic Treaty distinguishes between Antarctic Treaty Consultative Parties, those states conducting substantial scientific activities in Antarctica, and other states parties. The former are entitled to participate in meetings that take decisions regulating conduct in the Antarctic Treaty region.

The scope of potential liability extends to all governmental and non-governmental activities for which advance notice is required under the Treaty, including tourism. The system is thus a “mixed” one of liability for operators whether they are governmental or non-governmental actors. This is significant, because many activities in Antarctica are conducted or sponsored by governments. Each state party is to require its operators to undertake reasonable preventive measures, establish contingency plans for responses to incidents with potential adverse environmental impacts, and take prompt and effective responsive action when an emergency results from its activities. If the operator fails to take responsive action, the relevant party is “encouraged” to take such action, as are other parties after notifying the party of the operator, if such notification is feasible. Any operator that fails to take prompt and effective responsive action is liable to pay the costs of responsive action taken by other parties. Where the defaulting operator is a state operator and no party took responsive action, the state operator is liable to pay the equivalent of the costs of responsive action that should have been taken. This sum is paid into a fund maintained and administered by the Secretariat of the Treaty for the reimbursement of the reasonable and justified costs incurred by a party or parties in taking responsive actions to environmental emergencies Art. 12.

Liability is strict with some exceptions; liability will not be imposed if the operator proves that the emergency was caused by (1) an act or omission necessary to protect human life or safety; (2) an exceptional natural disaster that could not have been reasonably foreseen, provided all reasonable preventive measures have been taken; (3) an act of terrorism; or (4) an act of belligerency against the activities of the operator. Sovereign immunity for warships is maintained, limits on liability are provided, and operators are to be required by each party to maintain adequate insurance or other financial security.

Residual state liability is also included in the Annex. Although Art. 10 is drafted in the negative, to assume no liability, it nonetheless sets forth circumstances in which a party will be held liable:

A Party shall not be liable for the failure of an operator, other than its State operators, to take response action to the extent that the Party took appropriate measures within its competence, including the adoption of laws and regulations, administrative actions and enforcement measures, to ensure compliance with this Annex.

Although this article clearly envisages state liability for state operators, it discusses state responsibility as well. It refers to a state’s failure to comply with its legal obligations to take appropriate measures to prevent harm by non-state actors within its jurisdiction. Such omissions are often the basis of claims against states under the law of state responsibility.

Since 1978, the International Law Commission has considered the question of “international liability for injurious consequences arising out of acts not prohibited by international law.” In 1997, the ILC decided to deal only with the question of prevention of transboundary damage from hazardous activities, and within four years it was able to present to the UN General Assembly a completed set of 19 articles on this topic. See *Draft Articles on Prevention of Transboundary Harm from Hazardous Activities*, in Report of the International Law Commission on the Work of its Fifty-Third Session, UNGAOR, 56th Sess. Supp. No. 10, UN Doc. A/56/10 370 (2001). The General Assembly reviewed the articles and, pressed by certain member states, asked the ILC to continue working on the topic of international liability, “bearing in mind the interrelationship between prevention and liability.” Res. 56/82 of Jan. 18, 2002. In July 2004 the ILC provisionally adopted a draft set of *Principles on Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities* on first reading. After comments by states, the text was finally adopted in May 2006. See *Draft Report of the International Law Commission on the Work of its Fifty-Eighth Session*, Chapter V: International Liability for Injurious Consequences Arising out of Acts not Prohibited by International Law (International Liability in Case of Loss from Transboundary Harm Arising out of Hazardous Activities), UN Doc. A/CN.4/L.693/Add.1, June 9, 2006. To a large extent, these efforts can be seen to supplement and complete the ILC Articles on Responsibility of States for Internationally Wrongful Conduct, although the content of the adopted rules appears largely to repudiate state liability when the state has complied with the Draft Articles on Prevention.

The draft principles correctly approach the issue as one of allocating the risk of loss due to harm resulting from lawful economic or other activities, when the relevant state has complied with its due diligence obligations to prevent transboundary harm. The articles provide a general framework for states to adopt domestic law or conclude international agreements to ensure prompt and adequate compensation for the victims of transboundary damage caused by lawful hazardous activities. An additional purpose of the draft principles is mentioned: “to preserve and protect the environment in the event of transboundary damage, especially with respect to mitigation of damage to the environment and its restoration and reinstatement.” This progressive principle should be read in the light of the broad definitions of damage,³ environment⁴ and hazardous

³ In addition to personal and property losses, damage includes “loss or damage by impairment of the environment, the costs of reasonable measures of reinstatement of the environment, including natural resources, and the costs of reasonable response measures.” Principle 2(1) (iii–v).

⁴ Environment includes natural resources, both abiotic and biotic, such as air, water, soil, fauna, and flora, and the interaction between the same factors, and the characteristic aspects of the landscape. Principle 2(b).

activity⁵ set forth in Principle 2. While there is an important restriction in the exclusion of harm to the commons from the scope of these principles, on the whole they give a prominent place to the protection and preservation of the environment *per se* for the benefit of present and future generations.

The draft principles support existing state practice, which largely channels liability to the owner or operator and requires financial guarantees to cover future claims of compensation. In appropriate cases, industry-wide funds should be established at the national level. The articles do not support strict liability between states, unless the state itself is the operator. The Commentary to the Draft Principles is clear that “[i]t is envisaged that a State could be an operator for purposes of the present definition” and thereby become strictly liable. UN Doc. A/CN.4/L.693/Add.1, at 41, para. 33. For non-state activities, state obligations are more limited. Principle 4(5) provides that in the event that the measures for operator liability are insufficient, “the State of origin should also ensure that additional financial resources are made available.” The state also must promptly notify all states that are potentially or actually affected by an incident, ensure that appropriate response measures are taken, and provide domestic remedies against the responsible party. Other measures are recommended, including consultation on measures of mitigation, seeking the assistance of competent international organizations, and providing appropriate access to information on remedies. In addition, states may negotiate specific agreements on the topic of strict liability.

The lack of any serious consideration of state liability may be understood in the context of the prior articles on prevention: failure to fulfill the due diligence duty to prevent breaches an international obligation and shifts the applicable legal regime to one of state responsibility. Still, to dismiss liability as “a case of misplaced priority”⁶ ignores existing positive law, which has accepted the principle of state liability in a series of treaties concerning ultrahazardous activities that are largely conducted by state actors. Nonetheless, the ILC appears to have decided that strict liability of states does not even have support as a measure to progressively develop the law. Instead, the ILC limits itself to noting that certain categories of hazardous activities might be included in treaties providing for state-funded compensation schemes to supplement civil liability. It stops well short of finding that such compensation is legally required.

⁵ In probably the broadest definition contained in the draft articles, a hazardous activity “means an activity which involves a risk of causing significant harm.” Principle 2(c). This definition appears to extend strict liability considerably beyond that provided in most domestic law.

⁶ P.S. Rao, “First Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising out of Hazardous Activities,” UN Doc. A/CN.4/531/7 (2003).

Strict liability of states thus remains controversial, and the preference is clearly in favor of imposing civil liability on operators. Those subject matters for which state liability has been accepted in practice are consistent with this approach, because they largely concern activities undertaken by government actors, at least until recently: e.g., outer space exploration and exploitation and Antarctic scientific research. States seem willing to accept strict liability for their own conduct, but not for that of private actors.

Chapter II

The Development of International Environmental Law

As in other areas of law, religious or ethical beliefs may motivate individuals and governments to press for environmental protection. An additional basis for action at the international level is the desire to avoid interstate conflicts over depleted or scarce resources or consequent to incidents of transfrontier pollution.

Religious texts may motivate believers in favor of environmental protection. In Judeo-Christian religious traditions, the “dominion” given humans over other living beings in the first of the Creation stories in Genesis has been interpreted not to grant ownership, but rather to establish the right to beneficial use, imposing a type of guardianship or a trust. A 1983 Muslim study of the relationship between Islam and environmental protection underscored that humans are seen as forming part of the universe, whose elements are complementary to one another in an integrated whole. Humankind has a special relationship to the other parts of nature, a stewardship of utilization and development. Many indigenous religions also contain precepts on respect for all life and impose duties on individuals and the community to avoid waste or harm. See H. Hannum, *New Developments in Indigenous Rights*, 18 VA. J. INT’L L. 649, 666 (1988).

Environmental ethicists construct environmental protection around concepts of equity and justice, as seen in three sets of relationships: among existing persons, between present and future generations, and between humans and other species. See K. BOSSELMAN, *WHEN TWO WORLD’S COLLIDE: SOCIETY AND ECOLOGY* (1995); C. STONE, *THE GNAT IS OLDER THAN MAN: GLOBAL ENVIRONMENT AND THE HUMAN AGENDA* (1993); R. NASH, *THE RIGHTS OF NATURE: A HISTORY OF ENVIRONMENTAL ETHICS* (1989). Self-interest also provides a rationale for attention to the environment. Humanity’s concern with long-term human survival also underlies many legal and social norms and may be grounded in a genetic or biological

imperative. Interest in survival of the human species requires that “humanity” be seen to include not only present but also future generations. From these various origins, concern for the environment has emerged.

A. THE BEGINNINGS TO THE STOCKHOLM CONFERENCE

Before the 19th century, some municipalities and states made sporadic efforts to address local forms of pollution or nuisances, such as smoke, noise, and water pollution. The first international agreements dealt with shared living resources and appeared only in the 19th century, with the conclusion of international fishing treaties and agreements to protect various plant species. The primary purpose of the agreements was to sustain the harvesting of economically valuable species. This required international action, because many of the species were migratory or they were located in areas outside national boundaries, such as on the high seas.

The 1902 Convention for the Protection of Birds Useful to Agriculture (Paris, Mar. 19, 1902) was the first global convention to enter into force for the protection of designated wildlife species. Its title reveals the narrow perspective of those who adopted it. The Convention concerned *useful* birds, especially insectivores, and was aimed primarily at enhancing agricultural production. Annex 2 numbered among “non-useful birds” the majority of predators, including some eagles and falcons, which are strictly protected today. The criterion was short-term utility, the immediate usefulness of the protected species to the targeted human activity. The role of other birds in ecosystems, particularly hunters of small rodents, was ignored. The same utilitarianism characterized the bilateral United States-Great Britain Treaty Relating to the Preservation and Protection of Fur Seals (Washington, Feb. 7, 1911), and the 1957 Convention joining Japan and Russia to the earlier agreement. Interim Convention on Conservation of North Pacific Fur Seals (Washington, Feb. 9, 1957), 314 UNTS 105. Despite the narrow focus, these early treaties set precedents widely followed in later MEAs, calling for strict enforcement measures, including national quotas, and regulating international trade in objects produced from seal hunting.

Several early boundary waters treaties contained measures to reduce and prevent water pollution, since neither state could protect water quality without the other state’s cooperation. The agreement respecting boundary waters between the United States and Canada (Washington, Jan. 11, 1909) is still considered a model. It remains in force and was strengthened during the 1970s by other agreements—United States-Canada Agreement relating to the Establishment of Joint Pollution Contingency Plans for of Oil and Other Noxious Substances (June 19, 1974), 25 UST 1280, TIAS 7861; United States-Canada Agreement on Great Lakes Water Quality with Annexes (Nov. 22, 1978), 30 U.S.T. 1383, TIAS No. 9257, amended Oct. 16, 1983, TIAS No. 10798. The original agreement instituted a mixed com-

mission that continues to play a role in pollution control. Following World War I, other riparian states entered into boundary water agreements that included provisions on the problem of water pollution and frequently established international commissions. Generally, however, they did not set specific water quality standards.

Some genuinely ecological approaches emerged in the 1930s, with the adoption of two regional instruments that can be seen as precursors to present-day approaches to environmental protection. First, the Convention Relative to the Preservation of Fauna and Flora in their Natural State (London, Nov. 8, 1933) applied to an Africa then largely colonized. The London Convention and the other instrument, the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Washington, Oct. 12, 1940), envisaged the establishment of reserves and the protection of wild animals and plants, especially migratory birds.

International jurisprudence contributed to international environmental law during this period by introducing the fundamental principles that dominate the law of transfrontier pollution. The *Trail Smelter* arbitration of March 11, 1941, affirmed that no state has the right to use its territory or permit it to be used to cause serious damage by emissions to the territory of another state or to the property of persons found there. Arbitral Award in the *Trail Smelter Case* (Mar. 11, 1941), 3 UNRIAA 1905. Subsequently, the International Court of Justice held more generally in the *Corfu Channel* case that no state may utilize its territory contrary to the rights of other states. *Corfu Channel Case (U.K. v. Albania)*, Merits, 1949 ICJ 4 (Apr. 3). These precedents furnished the first legal principles from which present environmental law has evolved.

After World War II, the international community responded to specific environmental threats caused by technological change and expanded economic activities. The growing use of supertankers to transport oil by sea led to the first efforts to combat marine pollution during the 1950s. The utilization of nuclear energy led to other international regulation. A 1963 treaty, for example, restricted some military uses of radioactive materials. See Treaty Banning Nuclear Weapons in the Atmosphere, in Outer Space, and Underwater (Moscow, Aug. 5, 1963), 480 UNTS 43, 14 UST 1313. During this period, environmental concerns also increasingly appeared in general international legal texts.

The present ecological era can be said to have begun at the end of the 1960s, after post-World War II reconstruction led to unprecedented global economic development. This development was unequal, accentuating differences in wealth between countries of the Northern and Southern hemispheres as well as within countries. It required expanded use of exhaustible natural resources such as clean water, air, flora, fauna, and minerals. It also produced high levels of waste. Further problems arose from the "green revolution" in agriculture, which relied heavily on DDT and other pesticides whose dangers were not at first recognized.

As the harm to the natural world and human health increasingly became evident, informed public opinion demanded action to protect the quantity and quality of the components of the environment. Scientific studies, as well as popular publications like Rachel Carson's book *The Silent Spring*, raised general awareness of dangers threatening the environment. Public opinion mobilized at the grass roots to urge governments to adopt environmental policies. The movement was transnational from the beginning and emerged from a changing philosophical and ethical consensus, incorporating new social values in reaction to the post-war "consumer society." The ecological movement spanned across ideologies and political parties with the result that many early environmental laws were adopted unanimously by national legislatures.

These factors partly explain the brevity of time it took for international organizations to recognize the emergence of a new international concern. Another factor was media coverage of the first oil tanker disaster. The 1967 "black tides" off the coasts of France, England, and Belgium, caused by the grounding of the oil tanker *Torrey Canyon*, sharply emphasized the growing threats to the environment. The United Nations took action in 1968 shortly after the *Torrey Canyon* incident, when the General Assembly convened the World Conference on the Human Environment, held in Stockholm in 1972. G.A. Res. 2398 (XXIII), Dec. 3, 1968. This decision gave rise to intense and diverse activity, particularly within intergovernmental organizations whose mandate could be interpreted to extend to environmental problems. Numerous national and international non-governmental environmental organizations and governments also engaged in preparatory work.

Even prior to the Stockholm Conference, international cooperation sought to counter marine oil pollution through adopting preventive measures and establishing liability rules. Several steps also were taken to conserve wild animals and their habitats, notably the conclusion of the Convention on Wetlands of International Importance (Ramsar, Feb. 2, 1971) and the Convention for the Conservation of Antarctic Seals (London, June 1, 1972).

While these actions responded to some of the urgent environmental problems, ambitious preparations for the Stockholm Conference continued, based on the work of a special committee of 27 states advising the UN Secretary-General. When the Stockholm meeting took place June 5–16, 1972, it brought together some 6,000 persons, including delegations from 113 states, representatives of every major intergovernmental organization, 700 observers sent by 400 non-governmental organizations, invited individuals, and approximately 1,500 journalists. This level of participation reflected the high profile of environmental concerns at the time.

The inclusiveness helped the Conference achieve an internationally recognized significance, particularly in bringing together the developed and developing countries. Prior to the Stockholm Conference, many poor

countries did not accept the necessity of global cooperation to protect the environment, because such problems were considered predominately an ailment of rich, industrialized countries. In fact, prior to Stockholm, a General Assembly resolution on development and the environment stated that standards to preserve the environment “as a general rule will have to be defined at the national level and, in all cases, will have to reflect conditions and systems of values prevailing in each country.” Furthermore “each country has the right to formulate, in accordance with its own particular situation and in full enjoyment of its national sovereignty, its own national policies on the human environment, including criteria for the evaluation of projects.” G.A. Res. 2849, adopted Dec. 20, 1971, UN Doc. A/Res. 2849 (XXVI) (1972), 11 ILM 422. The vote on the resolution indicated the North-South divide, with 85 states in favor, and 34 against, the latter group including developed countries like the United States and the United Kingdom.

Coming to Stockholm, developing countries continued to voice fears that wealthy nations would condition foreign economic assistance on environmental protection or divert funds previously dedicated to development to fight environmental deterioration.

The Conference adopted texts of lasting importance during a closing plenary session, notably the Stockholm Declaration on the Human Environment, adopted on June 16, 1972, by acclamation, an “Action Plan” containing 109 recommendations and a long resolution proposing institutional and financial commitments by the United Nations. These were the first comprehensive statements of international concern with environmental protection.

The Stockholm Declaration on the Human Environment begins with a preamble describing the scientific and economic bases for concern with the environment. It affirms that that man is at once the creature and molder of his environment and that the natural and the man-made elements of the environment are essential to human well-being and to the full enjoyment of basic human rights, including the right to life. The preamble recognizes that the natural growth of the world’s human population continuously poses problems for preserving the environment, but expresses a conviction that with social progress and the evolution of production, science, and technology, human ability to improve the environment will strengthen. Protecting the environment is also viewed as a major issue for economic development. Developing countries insisted that the Stockholm Declaration acknowledge that:

[i]n the developing countries most of the environmental problems are caused by underdevelopment. Millions continue to live far below the minimum levels required for health and sanitation. Therefore, the developing countries must direct their efforts to development, bearing in mind their priorities and the need to safeguard and

improve the environment. For the same purpose, the industrialized countries should make efforts to reduce the gap between themselves and the developing countries.

The principles contained in the second part of the Declaration translate the preambular concepts into normative statements and concrete bases for action, while reflecting the various political preoccupations of the meeting's participants. The first principle, for example, affirms the fundamental human rights to liberty, equality, and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being, adding that man bears a solemn responsibility to protect and improve the environment for present and future generations. The principle concludes by condemning apartheid, racial segregation, and discrimination, colonialism, and other forms of oppression and foreign domination. Principle 1 is primarily significant today as the first statement of a link between environmental protection and human rights, a matter of considerable jurisprudence in the subsequent three decades.

Principles 2 to 7 constitute the ecological heart of the Declaration. They proclaim that the natural resources of the globe are not only oil and minerals, but also air, water, earth, plants, and animals, as well as representative samples of natural ecosystems. These should be preserved in the interest of present and future generations. Humanity has a particular responsibility to safeguard the heritage of wildlife and its habitats. Renewable resources must maintain their ability to replenish themselves and non-renewable resources should not be wasted. The Declaration emphasizes the necessity of adequate resource management in all cases. This section concludes by calling for a halt to the production of toxic wastes or other matter that cannot be absorbed by the environment and for the prevention of marine pollution. Principles 13 to 15 underline the necessity of integrated, coordinated, and rational development planning.

The last group of principles, 21 to 26, is of particular interest in the development of international environmental law. Principle 21 is generally recognized today as expressing a basic norm of customary international environmental law:

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that the activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.

Principle 22 follows this by calling on states to cooperate in developing international law regarding liability and compensation for victims of pollution and other extra-territorial environmental damage.

Principle 23 recommends that states further develop international environmental law, taking into consideration the system of values prevailing in each country, in particular in developing countries. Principle 23 thus alludes to the now widely recognized notion that a distinction may be necessary in applying environmental norms according to the state of development of different countries, a concept incorporated in many environmental agreements today as the principle of “Acommon but differentiated responsibilities.” See Chapter V, Section C.2. The Action Plan also contains sections dedicated to economic and social development as a condition for environmental protection. Various principles promote transfer of financial and technical aid, stability of prices, and adequate remuneration for basic commodities and raw materials, enhancement of the potential for progress of developing countries, and international assistance to aid developing countries to face costs that can delay incorporation of environmental safeguards in development planning.

The Stockholm Conference had immense value in drawing attention to the problem of environmental deterioration and methods to prevent or remedy it. The Conference was global both in its planetary conception of the environment, and in its view of institutional structures and world policies. It was also global in addressing all the major environmental themes of the time.

B. FROM STOCKHOLM TO RIO

The vision of Stockholm dominated the subsequent evolution of environmental law over the following decade. International environmental law substantially increased after the Stockholm Conference. The dominant approach of the 1970s, both in national laws and internationally, concentrated on protecting specific sectors of the environment: marine and fresh waters, atmosphere, outer space, wild plants, and animals. During the 1980s, it became increasingly evident that this sectoral or end of the pipeline approach was insufficient to address environmental deterioration. Thus, a new approach emerged, which aimed to regulate sources and risks of harm, especially those that could affect more than one sector. This eventually led to common management of shared resources and holistic ecosystem protection.

In the 1980s, new problems emerged that had not been perceived earlier, such as long-range air pollution and depletion of the ozone layer. The global Convention for the Protection of the Ozone Layer (Vienna, Mar. 22, 1985) and its Protocol (Montreal, Sept. 16, 1987) created an effective international system to reduce levels of ozone-depleting substances. The unprecedented nuclear catastrophe at Chernobyl, April 26, 1986, raised awareness of the risks of nuclear power plants and led to the almost immediate adoption of two conventions, the first requiring rapid notification of nuclear accidents, the second covering assistance in the case of a nuclear

accident or radioactive emergency. See Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Vienna, Sept. 26, 1986).

As environmental laws evolved, it became clear that substances and processes that threaten to cause environmental harm must be regulated during their entire lifetime, including waste disposal. The issue became an international one when waste generators, seeking to dispose of their wastes at the least possible expense, began extensive dumping of toxic and hazardous wastes in developing countries. The Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, Mar. 22, 1989) and regional treaties on the topic concluded for Africa (Bamako, Jan. 29, 1991), Central America (Panama, Dec. 11, 1991) and the South Pacific (Waigani, Sept. 16, 1995) contributed significantly to reducing the frequency of this practice. As discussed further at in Chapter VIII, Section E.2, the African treaty made it a crime to import toxic or hazardous waste from outside the continent.

A few principles of customary law concerning environmental relations among states emerged during the period following the Stockholm Conference, building on Principle 21. Some of them were formulated first within the OECD and then adopted by the UN Environment Program (UNEP) in its text on "Principles of conduct in the field of the environment for the guidance of States in the conservation and harmonious utilization of natural resources shared by two or more states." Approved by UNEP's Governing Council May 19, 1978, the Principles on Shared Resources reiterate Stockholm Principle 21 in recognizing the sovereign right of states to exploit their own resources coupled with an obligation to ensure that the activities undertaken within the limits of their jurisdiction or under their control do not damage the environment in other states. The UNEP Principles also articulate the obligation of states to notify other states of planned activities that can be expected to affect significantly their environment, to enter into consultations with them, and to inform them and cooperate in case of unforeseen situations that could cause harmful effects to the environment. The measures guarantee to non-residents equality of access to administrative and legal procedures in the state of origin of the harmful conduct and non-discrimination in the application of national legislation to polluters, whatever the place of the harmful effects.

In 1983, the General Assembly voted to create the World Commission on Environment and Development, an independent body linked to but outside the UN system and later more commonly known as the Brundtland Commission. Its mandate was to take up the critical relationship between environmental protection and economic development and to formulate realistic proposals for reconciling or balancing the two subjects; to propose new forms of international cooperation on these issues to influence policies in the direction of needed changes; and to raise the levels of understanding and commitment to action of individuals, organizations,

businesses, and governments. The conclusions of the Brundtland Report stressed the need for an integrated approach to development policies and projects that, if environmentally sound, should lead to sustainable economic development in both developed and developing countries. The Report emphasized the need to give higher priority to anticipating and preventing problems. It defined "sustainable development" as development that meets present and future environment and development objectives and concluded that without an equitable sharing of the costs and benefits of environmental protection within and between countries, neither social justice nor sustainable development can be achieved.

The Brundtland Report led the United Nations to convene a second global conference on the environment in 1992 in Rio de Janeiro, Brazil, under the title UN Conference on Environment and Development (UNCED). The very name of the conference reflected a change of approach from that of the Stockholm Conference on the Human Environment. UNCED met in Rio de Janeiro from June 3–14, 1992. One hundred seventy-two states (all but six members of the United Nations) were represented by close to 10,000 participants, including 116 heads of state and government; Japan alone sent 300 delegates. One thousand four hundred non-governmental organizations were accredited as well as nearly 9,000 journalists.

Five texts emerged from the meeting. Two important conventions, drafted and adopted before the Conference, were opened for signature at Rio: the UN Framework Convention on Climate Change and the Convention on Biological Diversity. The Conference also adopted a declaration whose title reflects the difficulties of reaching agreement on it: "Non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests."

Two texts adopted at UNCED have a general scope: the Declaration on Environment and Development and an action program called Agenda 21. The Declaration, a short statement of 27 principles, has a composite character that its legislative history can explain. It reaffirms the Stockholm Declaration of 1972 on which it seeks to build, but its approach and philosophy are different. The central concept is sustainable development, as defined by the Brundtland Report, which integrates development and environmental protection. Principle 4 is important in this regard: it affirms that in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

The Rio Declaration contains several principles of an unambiguous, if general, legal character. It reinforces some existing principles and proclaims new ones. Principle 2, which concerns the transboundary effects of activities, reaffirms Principle 21 of the Stockholm Declaration but adds the word "developmental." Other preexisting legal norms are restated in

Principle 10, affirming rights of public information, participation, and remedies; Principle 13, which calls for the development of liability rules; and Principles 18 and 19, which require notifying other states about emergencies and projects that may affect their environment. New international principles include the precautionary principle (Principle 15), the “polluter pays” principle that requires internalization of environmental costs (Principle 16), and the general requirement of environmental impact assessment for proposed activities (Principle 17). Principle 11 stresses the importance of enacting effective environmental legislation, although it notes that standards applied by some countries may not be appropriate to others because of the economic and social costs involved.

Other principles are more in the nature of policy guidelines, although the line between law and policy is not always clear. A distinction can be made between three groups of policy provisions. The first group expresses concern for development and poverty alleviation within states. The second group of principles addresses the world economic order and trade relations. A last group of principles concerns public participation. Principle 10 recognizes for individuals the rights to information, to participation, and to remedies in environmental matters. Principles 20 to 22 stress the importance of the participation of women, youth, and indigenous peoples, but the terms used show that these provisions are more guidelines than legal norms.

The second general document adopted by the Rio Conference is Agenda 21, a program of action consisting of 40 chapters with 115 specific topics contained in 800 pages. There are four main parts:

- socio-economic dimensions (e.g., habitats, health, demography, consumption, and production patterns);
- conservation and resource management (e.g., atmosphere, forest, water, waste, chemical products);
- strengthening the role of non-governmental organizations and other social groups, such as trade unions, women, youth;
- measures of implementation (e.g., financing, institutions).

The chapters concerning the atmosphere (Chapter 9), biological diversity (Chapter 15), the oceans (Chapter 17), and freshwater resources (Chapter 18), as well as discussion of specific problems such as biotechnology (Chapter 15), toxic chemicals (Chapter 19), and waste (Chapters 20–22) are of particular interest in the development of environmental law. Additionally, two chapters are dedicated to international institutional arrangements (Chapter 38) and international legal instruments and mechanisms (Chapter 39).

The chapter on international legal instruments has implications for international law in general. It insists on the legal aspects of sustainable development and on the adoption of environmental standards. It calls for

the integration of environment and development policies in international treaties and emphasizes the participation in and the contribution of all countries to the further elaboration of international environmental law in the context of sustainable development. It calls for improvement in the efficacy of international environmental law, in particular by procedures and mechanisms to promote and review the implementation of treaties, such as efficient and practical reporting systems.

Agenda 21 pays particular attention to national legislation. It makes frequent reference to national laws, measures, plans, programs, and standards. Chapter 8, "Integrating Environment and Development in Decision-Making," advocates the use of legal and economic instruments for planning and management, with incorporation of efficiency criteria in decisions. It recognizes the importance of country-specific laws and regulations for transforming environment and development policies into action, adding that not only "command-and-control" methods should be used but also a normative framework for economic planning and market instruments. Such methods can also be useful for the implementation of international treaty obligations.

Governments should regularly assess the effectiveness of their laws and regulations and the related institutional or administrative machinery with a view to rendering them effective; integrated strategies should be developed to maximize compliance with laws and regulations relating to sustainable development. Finally, remedial justice is encouraged; governments "should establish judicial and administrative procedures for legal redress and remedy" for individuals, groups, and organizations with a recognized legal interest to challenge unlawful actions affecting the environment.

In sum, the Rio documents join environmental protection and economic development in the concept of sustainable development. This emphasis is understandable, because the current economic system presents numerous challenges to environmental protection. The north-south disparity in wealth and other resources creates difficulties in imposing uniform norms and standards through international agreements. The desire for free trade in goods and services in the international economic system raises opposition to trade barriers adopted to protect the environment.

A related issue is competitive disadvantage: a state taking measures to protect the environment must count the increased costs which are borne by its economy. Preoccupation with conditions of competition is evident in the work of the Organization of Economic Cooperation and Development (OECD) and the environmental side agreement to the North American Free Trade Agreement (NAFTA). The latter calls for cooperation to better conserve, protect, and enhance the environment, while avoiding the creation of trade distortions or new trade barriers.

The solidarity imposed by global problems necessitates better cooperation between industrialized and developing countries. Full collaboration involves assisting poor countries to face the burden of implementing envi-

ronmental measures that serve to safeguard the biosphere as a whole, recognizing that global poverty is a major cause of environmental degradation and poses additional problems for developing countries. Solidarity and the special needs are reflected in the principle of common but differentiated responsibilities. The result is an increased emphasis on partnership and mutuality in multilateral environmental protection, as well as on the interrelationship of environmental protection and development.

Although at first some contested the importance of the Rio Conference legal texts, the two Conventions and the Declaration represent milestones in international environmental law. Several principles of the Declaration, such as public participation, the prior assessment of environmental impacts, precaution, notification of emergencies, and prior information and consultation on projects potentially affecting the environment of other states, have been included in numerous binding and non-binding international instruments since Rio and constitute emerging customary law rules, as discussed in Chapter V.

C. THE IMPACT OF THE RIO CONFERENCE

In the aftermath of Rio, virtually every major international convention concerning multilateral cooperation included environmental protection as one of the goals of the states parties. Areas of international law that developed during earlier periods began evolving in new directions because of insistence that they take into account environmental considerations. The result was an infusion of environmental norms into nearly every branch of international law. In the area of trade relationships, for example, the Charter Establishing the World Trade Organization (Marrakesh, Apr. 14, 1994) and regional free trade agreements mentioned environmental cooperation as an aim. The latter include the Treaty Establishing the South African Development Community (Windhoek, Aug. 17, 1992); Treaty Establishing a Common Market for Eastern and Southern Africa (Kampala, Nov. 5, 1993); Agreement on the North American Free Trade Area (Washington, Ottawa, Mexico City, Dec. 17, 1992); Tropical Timber Agreement (Jan. 26, 1994) and European Energy Charter (Dec. 17, 1994).

International environmental law concerns also spread into human rights law and humanitarian law. The human rights community came to view environmental protection as an appropriate part of the human rights agenda. Institutions from the UN Human Rights Commission to the World Health Organization and the International Committee of the Red Cross continue to show concern with environmental matters. International humanitarian law has moved to regulate weapons systems that cause indiscriminate effects. Chemical and nuclear weapons and anti-personnel land mines, in particular, have been condemned by the international community. For further discussion of human rights and humanitarian law, see Chapter VIII.

Other issues have emerged due to the continual necessity to anticipate or respond to the consequences of technological change. Advances in biotechnology have led to the need to promote biosafety, centered on two related issues: first, the handling of living modified organisms (LMOs) in the laboratory in order to protect workers and prevent the accidental liberation of such organisms into the surrounding ecosystem (“contained use”); second, the need for regulatory systems to govern the deliberate release of LMOs into the environment for testing or commercial purposes. States parties to the Convention on Biological Diversity adopted a protocol on biosafety on January 29, 2000, to address these issues. The Convention and Protocol are discussed in Chapter VII.

The importance of controlling substances harmful to the environment necessitates an active role for states engaged in international trade. As early as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, Mar. 3, 1973), states parties sought to limit trade in such species by introducing a requirement of double authorization by the exporting and the importing states. The same technique is a fundamental part of the Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel, 1989) and the Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (Bamako, 1991). It has been further developed by the Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam, Sept. 10, 1998) and by the 2000 Cartagena Protocol on Biosafety to the Convention on Biological Diversity. Such procedures allow states parties to control trade in goods and substances that could harm the environment.

Most states now accept that global efforts are required to solve many aspects of environmental deterioration, such as ocean pollution, depletion of stratospheric ozone, the greenhouse effect, and threats to biodiversity. The required cooperation necessitates adjustments between industrialized and developing countries. The International Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (June 17, 1994) is one of the most significant results of such cooperation, strongly reflecting the concept of common but differentiated responsibilities. In addition, it takes the principle of cooperation and melds it with the right of public participation, emphasizing the need for all levels of governance and civil society to be involved in actions to combat desertification.

Ecosystem protection has broadened and deepened as well. The earlier sectoral aim of protecting wild fauna and flora is now incorporated in the comprehensive goal of maintaining biological diversity *in situ*. This expanded and integrated vision includes efforts to reverse the trend towards monocultural agriculture and stockbreeding, as well as to combat the abuse of pesticides and fertilizers. An integrated or holistic approach

to environmental protection appears in particular in recent instruments concerning environmental protection in large ecosystems: Antarctica (Madrid Protocol of 1991), the Alps (Salzburg Convention of 1991 and Chambéry Protocols of 1994), the Arctic region (1996 Declaration), and the Carpathian Mountains Convention (Kiev, 2003).

The same trend can be seen in the shift to protecting freshwater resources as hydrographic units rather than as individual watercourses. The unity of water resources in a hydrographic basin and a consequent ecosystem approach to regulating such resources is now generally accepted. The UN Convention on the Non-Navigational Uses of International Watercourses (New York, May 21, 1997) which unified the international legal status of surface and subsurface water, hastened recognition of the need to regulate freshwaters within the entire catchment basin, mainly a regional task. The problem ahead is to organize the shared management of water resources by all riparian states.

D. THE WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD)

In the decade after the Rio Conference, environmental concerns encountered increasing competition on the international agenda from economic globalization, deregulation, and privatization, an emphasis on free trade, and the development crises of countries with high levels of poverty. The United Nations convened a conference to mark the tenth anniversary of the Rio meeting, but failed to mention the environment in its name. Instead, it was convened as the World Summit on Sustainable Development.

Between August 26 and September 4, 2002, the representatives of more than 190 countries met in Johannesburg, South Africa, in order to “reaffirm commitment to the Rio Principles, the full implementation of Agenda 21 and the Programme for the Further Implementation of Agenda 21.” At the end of the Conference the participating governments adopted a Declaration on Sustainable Development affirming their will to “assume a collective responsibility to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable development—economic development, social development and environmental protection—at local, national, regional and global levels.” Para. 5. While recognizing that “the global environment continues to suffer,” and acknowledging the loss of biodiversity, the depletion of fish stocks, the progress of desertification, the evident adverse effects of climate change, as well as the pollution of the air, of water and of the sea (para. 13), the Declaration mainly focused on development and poverty eradication, especially in the poorest countries.

The final declaration encouraged major economic actors to create “partnerships” for enhancing sustainable development. The rules of the WTO were given a high political status, while environmental law was relegated to second place. Nonetheless, the instruments adopted at the World

Summit did not affect the validity of Agenda 21, which continues to govern the environmental program of international institutions and remains a general guideline for governments, regional, and local authorities, as well as for non-state actors. Indeed, the WSSD reaffirmed the texts adopted at Rio and called for priority attention to two matters: (1) implementation of and compliance with international environmental agreements by contracting states, and (2) coordination among the secretariats of multilateral environmental agreements.

One can thus affirm that there has been increased recognition of the international and multidimensional character of environmental problems and potential remedies for them. However, state implementation of international environmental law and domestic policies has had limited success due to the frequent failure to take into account the interdependence of different sectors of the environment. A large proportion of marine pollution derives from land-based sources. Atmospheric pollution can affect the soil and imperil forests and buildings. Freshwaters receive a large part of their pollution from the soil, whose pollutants seep into the underground water table. All pollution endangers biodiversity. Such interrelationships necessarily have international consequences, because the transfer of pollution from one milieu to another will frequently result in transboundary impacts. Yet, there is no comprehensive international environmental agreement addressing these matters in a holistic manner nor is there a single agency addressing the problems. The lack of coordination among different agencies and treaty bodies has had some negative effect on the success of environmental laws and policies and is a priority issue for the future.

Environmental law and policy also must grapple with the lack of scientific certainty about many aspects of the physical world. Scientific uncertainty often attends issues of the nature and scope of the adverse environmental impacts of human activities. Exacerbating the uncertainty, damage often is measurable only years after the causative actions have occurred. Given this situation, questions arise over how to develop environmental policy and how to allocate risk between the present and the future. Many decisions cannot await scientific certainty, assuming something approaching certainty can ever be achieved. Therefore, debate centers on whether a policy should be adopted to assume harmful consequences will occur unless activities or products are proven safe or whether to take a less cautious approach, knowing that many environmental processes and changes may be irreversible and ultimately life-threatening.

In addition to uncertainty and irreversibility, environmental law must recognize the fact that the environment is dynamic and constantly evolving. This characteristic requires flexible laws and policies that are capable of rapid alteration in response to new circumstances. At the same time, and perhaps paradoxically, the legal framework must look long term in its efforts to maintain life and the ecological balance in an unseeable future.

46 Guide to International Environmental Law

Finally, the combined effect of substances can be very different than the environmental impact of each substance released separately. A chemical innocuous in isolation may be polluting or even highly toxic when combined with other substances in the environment. The need for precaution and an integrated or holistic approach thus emerges.

Chapter III

International Actors and Stakeholders

The expansion of international law that began in the 20th century continues unabated as new topics become matters of international concern. The density of norms and need for monitoring compliance with them has led to a proliferation of permanent global and regional international organizations. In addition, the spread of international law into regulatory areas that impact directly on business organizations and individuals, together with the emergence of national and international non-governmental organizations, have brought numerous actors and stakeholders into the international legal process. This chapter examines briefly the major players in the development and enforcement of international environmental law.

A. STATES AND STATE AUTHORITIES

In most states, the conduct of foreign relations is the exclusive responsibility of the national authorities and usually is the province of the executive branch. The VCLT reflects this practice by providing that heads of state and foreign ministers have inherent power to conclude treaties by virtue of the official positions they hold. VCLT, Art. 7(2). Throughout U.S. history, presidents have concluded both formal treaties, with the advice and consent of the Senate, and less formal agreements that do not pass through the Senate, except for informational purposes. See the Case Act, 1 U.S.C. § 112b (1994).

Given the wide range of international concerns in modern relations, federal authorities from numerous different agencies may be involved in making international agreements, especially touching on environmental matters. The Department of Justice concludes agreements on cooperation in criminal matters, for example, while NOAA has been active in negotiations over Antarctica and climate change.

Although the component states in federal unions generally lack treaty-making power, they are not absent from international relations and agreements with foreign authorities. The U.S. Constitution prohibits states within the United States from entering into treaties or alliances with other nations, U.S. Constitution, Art. I § 10(1), and federal preemption may preclude states from regulating a matter on which Congress has legislated or a treaty is in force. See *Crosby v. National Foreign Trade Council*, 530 U.S. 363 (2000); *Zschemnig v. Miller*, 389 U.S. 429 (1968). Yet, port authorities of different countries have concluded Memoranda of Understanding (MOUs) to improve and harmonize port state inspections of ships for compliance with international environmental and safety standards. MOUs generally require each maritime authority, which is a signatory to the agreement, to establish and maintain an effective system of port state control and set an annual required total of inspections of at least 10 percent of the estimated total number of foreign merchant ships entering the ports during the year. MOUs encourage exchange of information so that ships that have been inspected by one port state and found to be in compliance with all safety and marine pollution prevention rules are not subject to too frequent inspections, while ships presenting a hazard and those ships that have been reported by another port state as having deficiencies that need to be rectified will be targeted.

Implementation and enforcement of international agreements often requires action by local authorities, who generally regulate such matters as municipal waste disposal and zoning and enforce the state's criminal laws. International agreements do not dictate the division of authority over implementation and enforcement, seeking only compliance by the state as a whole. Nonetheless, many MEAs recognize the importance of action at the local level with public involvement. The UN Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (June 17, 1994), particularly emphasizes the need for effective measures at all levels of government, with national authorities facilitating action at the local level. Arts. 2.1, 3(a). One of the main elements of the Convention is the call for participation of local communities in decisions concerning the design and implementation of programs to combat desertification, with national action programs prepared and updated through a continuing participatory process. Arts. 3(a), 9.1, 10.2(f).

B. INTERNATIONAL ORGANIZATIONS

States usually create international institutions through adopting treaties, which serve as the organizations' constitutions, in order to ensure permanent cooperation in addressing matters of international concern. Nearly all such organizations are composed of states only, although some organizations call for the delegations to include representatives of non-gov-

ernmental interests. The International Labor Organization, for example, establishes that each delegation is composed of representatives from the government, the business sector, and organized labor.

Different types of international institutions have been assigned roles in the field of environmental protection. Many preexisting institutions, like the International Maritime Organization, already had a permanent body and a large scope of activities to which some tasks of environmental protection were added. Others were created for specific environmental purposes, usually in order to facilitate and monitor the implementation of a specific environmental treaty, such as those concerning the protection of wild fauna and flora, the preservation of the stratospheric ozone layer, the control of water quality of an international river or a part of the oceans. Such bodies are generally called Conference of the Parties (COP) or Meeting of the Parties (MOP) and they meet periodically while the ongoing functions related to the treaty are ensured by their secretariats.

The role of international institutions is important for several reasons. They allow policymakers and scientists to cooperate in monitoring the environment and, if necessary, updating existing international environmental rules. Such institutions also play an important role in supervising the implementation of norms, in particular of treaty rules. Further, they may facilitate the exchange of information based on national and international studies and on research programs.

With many national and international organizations engaged in studies or actions aimed at protecting the biosphere, concerns arise about efficiency and conflicting norms or policies. There are several ways to ensure efficient allocation of authority. The first and obvious limitation imposed on the activities of international organizations is the scope of the powers and functions granted each one; thus, the World Health Organization's mandate extends to problems affecting human health, the International Maritime Organization (IMO) is concerned with ocean pollution, and the Food and Agriculture Organization (FAO) addresses problems of water and soil. At the same time, the treaty mandates of international organizations are often written in broad terms and permit many subject areas and powers to be implied. Thus, the FAO addresses fisheries, as part of its food mandate, for which it must cooperate with UNEP and the IMO. The FAO also regulates pesticides and other hazardous chemicals.

Another division of authority is geographic. Certain environmental questions can be dealt with only on a global level, essentially by institutions within the UN system. Others are better addressed on a regional basis by regional organizations or on a subregional level, where a few states are concerned with the solution to a concrete problem of limited geographic scope. Examples of the latter include the pollution of a watercourse or a lake, or protected areas in a border zone, and the protection of endemic species of wild fauna or flora.

1. Global Institutions

The discussion of global organizations concerned with environmental protection must begin with the United Nations. Nearly all organs of the United Nations, including the Security Council and General Assembly, have been involved in decisions related to the environment. In addition, the General Assembly has created subsidiary organs whose mandates are specifically devoted either wholly or in part to environmental protection. The most important of these organs are the UN Environment Program, the Commission on Sustainable Development, the International Law Commission, and the UN Economic Commission for Europe.

In 1972, after and with the recommendation of the Stockholm Conference, the UN General Assembly created a subsidiary organ, the UN Environment Program (UNEP), to address environmental issues. As a subsidiary organ of the General Assembly, UNEP has no independent legal basis (or personality). Its mandate is to serve as a catalyst for action by other international institutions. It studies environmental problems and elaborates programs, but implementation usually is undertaken by the United Nations as a whole, with the aid, if appropriate, of regional governmental and non-governmental organizations, as well as individual states. One of UNEP's most important functions is to provide the secretariat of multilateral environmental conventions, including the 1973 Washington Convention on the International Trade of Endangered Species and the 1992 Convention on Biological Diversity.

The UN General Assembly also created, following the 1992 Rio Conference on Environment and Development, a Commission on Sustainable Development (CSD), the tasks of which are to (1) monitor the integration of environmental and developmental goals throughout the UN system, (2) coordinate intergovernmental decisionmaking on environmental and developmental goals, and (3) make recommendations on any new arrangements needed to advance sustainable development. The CSD also oversees state implementation of Agenda 21, the action program adopted by the Rio Conference.

The 34-member International Law Commission, established by the UN General Assembly in 1947 for the codification and progressive development of international law, has considered several topics important to environmental protection. In its early years, it helped codify the law of the sea. Later, it elaborated the Convention on the Non-Navigational Uses of International Watercourses and submitted it to the UN General Assembly, which adopted the ILC draft on May 21, 1997. In 2001, the Commission completed Draft Articles on Prevention of Transboundary Harm from Hazardous Activities and in 2006 it adopted Draft Articles on International Liability in Case of Loss from Transboundary Harm Arising Out of Hazardous Activities.

The UN Economic Commission for Europe, created in 1947 in the perspective of post-war economic reconstruction, was one of the first organizations to be involved in environmental problems. It has elaborated several important international environmental treaties, such as the 1979 Convention on Long-Range Transboundary Air Pollution, and the 1998 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.

The larger UN system includes specialized agencies, global institutions that have their own constitutions and independent legal personality. The UN Educational, Scientific and Cultural Organization (UNESCO) was one of the first specialized agencies to be active in the domain of environmental protection. In 1970 it launched the Man and Biosphere Program (MAB), commissioning a study on the interactions between humans and the environment, the impact of human activities on different sectors of the environment, and the conservation of natural areas and the genetic resources they contain. The establishment of “biosphere reserves” was one of the main components of the program; more than 425 sites have been recognized as such reserves, in almost 100 countries. UNESCO has also elaborated two major conventions: one on the Wetlands of International Importance (Ramsar, 1971), the other on the World Cultural and Natural Heritage (1972). The World Heritage Convention aims at the conservation of cultural or natural sites (monuments, particularly interesting parts of cities, protected natural areas). Over 830 items have been included in the World Heritage list, including more than 162 natural and 24 mixed natural and cultural sites.

The Food and Agriculture Organization (FAO) has as its mission to promote investment in agriculture, better soil and water management, improve yields of crops and livestock, and incite the transfer of technology to and the development of agricultural research in, developing countries. The FAO has contributed to the development of international environmental law by elaborating a series of instruments concerning soil quality, the use of pesticides, international fishing conservation and management measures, and plant genetic resources for food and agriculture. It also participated in drafting numerous international conventions. Its activities are the source of legislation in numerous countries, above all developing ones, regarding agriculture, forests, fishing, and soil conservation.

The principal mandate of the World Health Organization (WHO) is international cooperation in the interests of human health and, in particular, the elimination of epidemic, endemic, and other illnesses as well as improving housing and hospitals. At the beginning of the 1970s WHO developed a Global Strategy for Health and Environment. The problem of achieving the supply of safe drinking water has been a crucial issue to WHO. In addition, in cooperation with FAO, WHO established a Codex Alimentarius proposing safety criteria for food. WHO also sponsored the Anti-Tobacco Convention adopted 2004.

Created in 1947, the World Meteorological Organization (WMO) established a system of monitoring and rapid exchange of meteorological information, coordinated research, standardized observations, and encouraged applications of meteorological science, including prediction and modification of weather. These activities permit the observation of pollution and its persistence in the atmosphere. In addition, WMO is well placed to assess reduction of the stratospheric ozone layer and its consequences. WMO actively participated in the creation of a world system of continuous monitoring of the environment (GEMS). The legal office of WMO has helped elaborate international instruments on artificial weather modification, protection of the ozone layer, and long-range atmospheric pollution.

The International Atomic Energy Agency (IAEA) was created in 1956 in order to hasten and increase “the contribution of atomic energy to peace, health and prosperity in the entire world.” It has never had the mandate to prohibit utilization of nuclear power. Its functions include the task of establishing and overseeing implementation of norms designed to protect health and reduce to a minimum the dangers to which persons and property are exposed from radiation. Thus, for projects that the Agency assists or for any other arrangement where interested parties invite the Agency to apply its standards, the Agency seeks to ensure that the projects conform to its norms. It can require application of any safety measures it prescribes. The Agency adopts norms for nuclear safety and codes of proper procedure, including radioactive waste management, which it proposes to member states. It has adopted guidelines for monitoring and preventing radiological contamination of personnel and the environment, safe handling and the transport of radioactive materials, treatment and disposal of radioactive wastes, and containment and safety of nuclear power plants. In 1961, it published a regulation on transportation of radioactive materials, which it has revised several times.

After the Chernobyl nuclear accident of April 26, 1986, IAEA drafted two international conventions, one on Early Notification of a Nuclear Accident, the other on Assistance in the Case of Nuclear Accident or Radiological Emergency. The treaties were adopted September 26, 1986, by the IAEA general conference meeting in extraordinary session. The organization continues to be involved in standard-setting and in verification of nuclear safeguards.

The International Maritime Organization (IMO) was established in 1948 for the regulation of international commercial navigation. IMO’s first important responsibility was safety at sea, and it adopted a number of legal instruments on this topic, most importantly, the 1960 International Convention for the Safety of Life at Sea (SOLAS), updated and replaced in 1974. By the late 1960s, the increasing amount of oil being transported by sea in ever-larger oil tankers became a particular concern, especially after a number of major tanker accidents. In response, IMO adopted a series of measures designed to prevent accidents and to minimize marine

pollution due to oil. It also has tackled the major environmental threats caused by routine maritime operations, such as the cleaning of oil cargo tanks and the disposal of engine room wastes. Measures introduced by IMO also address the safety of containers, bulk cargoes, liquefied gas tankers, and other ship types. Special attention has been paid to ship crews, including the adoption of a convention on standards of training, certification, and watch-keeping.

The adoption of maritime legislation is IMO's most visible responsibility. The Organization has sponsored approximately 40 conventions and protocols, most of which have been amended on several occasions to ensure that they keep up with changes in world shipping. IMO's mandate has included establishing a system to ensure redress for those who suffer financially as a result of pollution. It adopted treaties in 1969 and 1971 to enable victims of oil pollution to obtain compensation simply and quickly, later followed by conventions on liability and compensation for other shipping hazards. For a discussion of the major liability treaties see Chapter I, Section E.2.

The International Labor Organization (ILO) has a constitutional mandate to assist countries in improving the working environment. Since 1919, the ILO has devoted a significant proportion of its efforts in that direction, especially through standard-setting activities. The extensive list of ILO instruments that concern occupational safety and health include the Working Environment (Air Pollution, Noise and Vibration) Convention (No. 148) and Recommendation (No. 156) (1977) as well as the Safety and Health in Construction Convention (No. 167) and Recommendation (No. 175), adopted in June 1988. The ILO also adopted conventions on chemicals in the workplace (1990), and agricultural work (2002), which contain provisions directly concerned with environmental protection. On January 17, 1995, ILO signed a Memorandum of Understanding Concerning Establishment of the Inter-Organization Program for the Social Management of Chemicals (IPCS), which created a framework for coordinating chemicals-related policies and activities with UNEP, the FAO, the WHO, the UN Industrial Development Organization, and the OECD; the MOU was revised in 1996 to add ethical considerations as an integral part of the IPCS's work. In 1994, the ILO launched an Interdepartmental Project on Environment and the World of Work. Since that time, environmental issues have become integrated in all programs and activities of the organization.

The International Civil Aviation Organization (ICAO) initially focused its efforts on aircraft noise, the first nuisance the public experienced from civil aviation. In addition to securing quieter aircraft, ICAO also has insisted on the importance of compatible land-use planning and control, in order to avoid offsetting the gains of reduced engine noise with further residential developments around airports. In the early 1980s, in response to concerns regarding air quality in the vicinity of airports, ICAO established

standards to control aircraft engine emissions through an engine certification scheme. These standards, contained in Volume II of Annex 16 to the Convention on International Civil Aviation, establish aircraft takeoff and landing emission limits for nitrogen oxides (NO_x), carbon monoxide, and unburned hydrocarbons. The NO_x standards were tightened in 1993 by 20 percent. The development of a new emissions parameter that would take into account technical performances, climb and cruise emissions, new communications, navigation, surveillance, and air traffic management could be a further effective means to reduce fuel burning and avoid unnecessary emissions.

The World Trade Organization (WTO) was created as the result of a long evolution. After World War II, the international community first envisaged an international organization with a comprehensive code governing all aspects of trade. Negotiations for the organization did not succeed but produced a General Agreement on Tariffs and Trade (GATT) in 1947. The GATT evolved as a set of normative standards and eventually developed some institutional elements through a series of eight multilateral rounds of negotiations. The last round of negotiations, known as the Uruguay Round, ended in December 1994 and led to formation of the WTO on January 1, 1995.

The Agreement Establishing the WTO, signed in Marrakesh, incorporates the original GATT and adds new undertakings on five main subject matters that have impacts on environmental protection. They are the Agreement on Technical Barriers to Trade, the Agreement on Sanitary and Phytosanitary Measures, the Agreement on Subsidies and Countervailing Measures, the Agreement on Trade-Related Aspects of Intellectual Property, and the General Agreement on Trade in Services. States joining the WTO undertake to comply with all these agreements. The WTO Dispute Settlement Understanding is another important feature of the organization; it establishes procedures for resolving trade disputes and creates a Dispute Settlement Body consisting of panels and an Appellate Body.

The WTO also has a Committee on Trade and the Environment (CTE) whose mandate is to identify the trade-related aspects of environmental measures and, if necessary, to make recommendations for modification of the rules of the multilateral trading system or attempt to resolve problems of policy coordination while upholding the principles of the multilateral trading system. In particular the CTE looks at the relationship between the trade rules and the use of trade measures for environmental purposes; the use of environmental charges and taxes and environmental standards for packaging, labeling, and recycling; the effect of environmental measures on developing country's market access and the environmental benefits of removing trade restrictions and distortions.

2. Regional Organizations

Almost all regional organizations have become engaged in developing environmental law. Organizations within Europe have the most comprehensive regulations for several reasons. First, the process of political and legal integration is most developed in Europe. Second, Europe is densely populated and highly industrialized, leading to greater concentrations of pollution. Finally, cooperation in environmental matters is facilitated by the homogeneity of economic structures and the similarity of political conceptions.

“European organizations” include entities that are very different from one another. Pan-European organizations, such as the Organization on Security and Cooperation in Europe (OSCE), are not exclusively European but include North American countries as participants. Similarly, all Western and Central European countries are members of the Organization for Economic Cooperation and Development (OECD), but so are the United States, Canada, Mexico, Japan, Korea, Australia, and New Zealand.

The oldest of the existing European institutions, the Council of Europe, was created in London May 5, 1949, and is based in Strasbourg. Today it consists of 46 states, nearly all the European countries except parts of the former Yugoslavia. The Council of Europe has sufficiently broad jurisdiction to address environmental issues, because Art. 1 of its statute permits it to consider all regional questions except those relating to national defense. Its broad competence is not accompanied by equally expansive powers, however. The Committee of Ministers, its executive organ, can adopt recommendations only. The other principal organ, the Parliamentary Assembly, has few powers but carries considerable weight with European public opinion in part because it is composed of representatives from the national parliaments. In fact, Assembly debates and the resolutions it addresses to the Committee of Ministers largely reflect European political consensus and often set forth solutions that are adopted subsequently either at the European or national level.

Since the end of the 1960s, conservation of the environment has been one of the principal concerns of the Council. Between 1968 and 1974, the Council adopted numerous declaratory texts, including the European Water Charter (1968), the Declaration of Principles on Air Pollution Control (1968), and the European Soil Charter (1972). The Council of Europe has also concluded a considerable number of environmental treaties since its initial effort to conclude the European Agreement on the Restriction of the Use of Certain Detergents in Washing and Cleaning Products (Sept. 16, 1968). The Council has adopted, for example, the Convention for the Protection of Animals during International Transport (Paris, Dec. 13, 1968) and the Bern Convention on the Conservation of European Wildlife and Natural Habitats (Sept. 19, 1979). The latter, a par-

ticularly important contribution in this field, created a permanent supervisory committee that functions within the Council of Europe. Other treaties concluded include the 1993 Lugano Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, the 1998 Convention on the Protection of the Environment through Criminal Law, and the 2000 European Landscape Convention.

The Council of Europe promotes transnational cooperation among local as well as national authorities. Its efforts have produced a European Outline Convention on Transfrontier Cooperation between Territorial Communities or Authorities (Madrid, May 21, 1980). The Convention explicitly designates environmental protection and mutual assistance in case of accidents among the topics that may be the object of joint action between local or territorial authorities from different states. The Convention annexes model agreements on questions such as transfrontier urban development and protection of nature, water, and air.

Finally, the European Court of Human Rights, established by the European Convention on Human Rights under the auspices of the Council of Europe, hears and decides cases alleging violations of human rights linked to environmental harm. See Chapter VIII, Section B.

The Organization for Economic Cooperation and Development (OECD), successor to the former Organization for European Economic Cooperation, was founded in 1948 to administer the Marshall Plan and took its current form in 1960. The executive organ of OECD is a Council composed of the representatives of member states. OECD can take decisions that are obligatory for all the member states who participate in their adoption, not including states that abstain. Resolutions adopted by the Council are obligatory for the organization itself. Recommendations addressed to the member states are not binding, but do reflect the general views and intentions of the governments which vote in favor of them.

The OECD secretariat is also an important part of the organization, because OECD is primarily an organ of study and economic reflection, responsible for making an inventory of resources, analyzing and elaborating measures for the future. OECD has published several of its studies: *Problems of Transfrontier Pollution* (1974); *Legal Aspects of Transfrontier Pollution* (1977); *OECD and the Environment* (1986).

OECD activities have a sufficiently broad scope to include issues of environmental protection. In 1970 OECD created a Committee on the Environment to take over the work of some 20 other committees. It aids the governments of OECD member states to define their policies in regard to environmental problems, taking into account pertinent information, especially economic and scientific, and to reconcile environmental policies with economic and social development. The Committee is entitled to review the state of the environment in member countries and regularly reports on the environmental performances of OECD countries. In 1991, with the creation of the Joint Session on Trade and Environment Experts,

the OECD became the first international organization to examine, on a regular basis, the integration of trade and environmental policies.

OECD has made major contributions to the development of international environmental law. OECD recommendations, sometimes accompanied by declarations of principles, formulated the first international legal definition of pollution and enunciated basic standards applicable to trans-frontier pollution. It also pronounced the obligations to inform and consult, to notify of emergency situations, the principle of equality of access between residents and non-residents, non-discrimination in the application of legislative rules, and the polluter pays principle. OECD has also adopted precise regulations concerning some types of air and water pollution. Its standard-setting has been decisive in the regulation of chemical substances, as well as toxic and dangerous wastes including radioactive wastes. In recent action, the OECD drafted for transmission by its governments a set of voluntary principles and standards for responsible business conduct. See *Guidelines for Multinational Enterprises*, June 27, 2000, 40 ILM 237 (2000). Section V of the text affirms that enterprises should take due account of the need to protect the environment and recommends good environmental management, communication with the public, and the adoption of preventive and precautionary approaches. Thus, despite or perhaps because of its essentially economic focus, OECD has been a pioneer in international environmental law.

The Organization for Security and Cooperation in Europe (OSCE) has fifty-five participating states and thus can claim to be the largest existing regional security organization. Its area includes continental Europe, the Caucasus, Central Asia, and North America, and it cooperates with Mediterranean and Asian partners. The OSCE thus brings together the Euro-Atlantic and the Euro-Asian communities "from Vancouver to Vladivostok." It succeeded to the Conference on Security and Cooperation in Europe,¹ more widely known as the Helsinki Conference, which adopted a Final Act on August 1, 1975. The Final Act contained a section specifically devoted to the environment. From the outset, the OSCE has emphasized cooperation, based on a conviction stated at the outset that many environmental problems, particularly in Europe, can be solved effectively through close international cooperation.

Following the Helsinki Conference, participating states met regularly to review compliance with the commitments made in the Final Act. The review involved monitoring economic and environmental developments among participating states, with the aim of alerting them to any threat of conflict. It also sought to facilitate the formulation of economic and environmental policies and initiatives to promote security in the OSCE area,

¹ In 1994 participating states changed the name of the body from the Conference on Security and Cooperation in Europe to the Organization for Security and Cooperation in Europe.

particularly in participating states involved in a process of political and economic transition. Three meetings focused specifically on economic, scientific, and environmental issues, beginning with a Meeting on the Protection of the Environment in Sofia in 1989. A Charter for European Security, adopted in Istanbul on November 19, 1999, addressed the economic and environmental dimensions of the OSCE's common response to the challenges it faces. Recalling the risk to security from environmental degradation and the depletion of natural resources, the Declaration stressed that economic liberty, social justice, and environmental responsibility are indispensable for prosperity. It proclaimed approval of the 1998 Aarhus Convention on Access to Information, Public participation in Decision-Making and Access to Justice in Environmental Matters.

The OSCE has no legal status as a formal organization under international law, and its decisions are politically but not legally binding. Nevertheless, it possesses most of the normal attributes of an international organization: standing decision-making bodies, permanent headquarters and institutions, permanent staff, regular financial resources, and field offices. Most of its instruments, decisions, and commitments are framed in legal language, and they are interpreted according to the principles of international law and the standard techniques of the law of treaties.

The Organization of American States (OAS) is the oldest regional political organization in the world, dating back to the First International Conference of American States held in Washington D.C. in 1890 and today deriving its legal authority from the 1948 OAS Statute. The OAS is made up of all independent states of the Western Hemisphere. Although the OAS Charter does not mention the environment and, as amended, places heavy emphasis on economic development, the Organization has long undertaken environmental activities, particularly concerning nature protection.

The Eighth International Conference of American States, meeting in Lima, Peru, in December 1938, recommended the establishment of a committee of experts to study problems relating to nature and wildlife in the American republics and called for preparation of a draft convention for nature and wildlife protection. Res. XXVIII: Protection of Nature and Wildlife, Eighth International Conference of American States (Dec. 1938). Two years later, the American states adopted the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Washington, June 4, 1940), 161 UNTS 193, 56 Stat. 1354, TS No. 981. States parties agree to adopt certain measures of mutual cooperation to preserve nature by establishing parks, reserves, and protected areas and to take all steps necessary to administer and conserve wildlife and nature and to protect threatened species.

Since its creation on 1948, the OAS has convened several inter-American meetings on environmental protection, including the 1965 Mar Del Plata Conference on Problems Related to the Conservation of Renewable

Natural Resources of the Continent. Several subregional multilateral agreements and numerous bilateral treaties also have been concluded. Since 1977, the OAS Secretariat has been instrumental in encouraging oil spill contingency planning in the wider Caribbean region, leading to adoption of the First Protocol of the Cartagena Convention for the Protection of the Marine Environment of the wider Caribbean Region.

In spite of increased environmental damage from air, water, and soil pollution, and the particular impact of acid rain on archaeological sites, OAS efforts to protect the environment have been hampered by regional poverty and debt. In June 1996, the OAS created a Unit of Sustainable Development and Environment. It is the principal entity within the General Secretariat responsible for matters directly related to sustainable development and the environment and for providing technical and administrative support to the Organization's efforts to become the principal inter-American forum formulating regional policy in this field. At the conclusion of a regional summit in 1996, the Heads of State and Government adopted the Declaration of Santa Cruz de la Sierra and the Plan of Action for the Sustainable Development of the Americas. The OAS Declaration is based on the Rio Declaration and on Agenda 21. The signatories confirm their intention to assess the environmental impact of their policies, strategies, programs, and projects nationally and in the framework of international agreements to ensure that adverse environmental effects are identified, prevented, minimized, or mitigated as appropriate. They express their intent to enhance the progress of international environmental law and promote the reform and modernization of national laws, as appropriate, to reflect sustainable development concepts. The Plan of Action lists a series of initiatives that the governments pledge to take on sustainable agriculture and forests, water resources and coastal areas management, mining, and energy production. The OAS Unit of Sustainable Development and Environment has been assigned the primary responsibility for the follow-up of the Summit on Sustainable Development.

The South Pacific region contains about 10,000 small islands scattered through the hemispheric South. Only 2 percent of the 30 million square kilometers of the area consists of land, and, consequently, it is an area for which living marine resources are particularly important. The region's environment has been harmed by nuclear tests and is further threatened by the dumping of radioactive waste. Two major regional organizations separately and cooperatively have elaborated legal instruments that aim to protect the vast Pacific territory. First, the South Pacific Commission, which was created in 1947, has nine participating states. The Commission is a consultative and advisory body that studies, formulates, and recommends measures regarding, *inter alia*, fisheries and forestry. The Commission is composed of 18 Commissioners, two appointed by each of the member states. The South Pacific Conference, which regularly meets, is an advisory body to the Commission, representing each state and territory within the

geographic scope of the Commission. Although the Commission and Conference were originally established to promote economic development, environmental issues have become increasingly important. As a result, the Commission launched a Special Project on Conservation of Nature and Natural Resources in July 1974. The project resulted in the 1976 Convention on Conservation of Nature in the South Pacific (Apia) and the Comprehensive Environmental Management Program.

A regional Conference on the Human Environment in the South Pacific, held in 1982, adopted a South Pacific Declaration on Natural Resources and the Environment, an Action Plan known as the South Pacific Regional Environment Program, and an agreement on administrative and financial arrangements to implement the Action Plan. After four years of work on the Action Plan, a 1986 conference adopted the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (Noumea, Nov. 25, 1986) and two protocols, one relating to pollution emergencies and the other concerning the prevention of pollution by dumping. Administration of the Convention and protocols is assigned to the South Pacific Commission.

The second Pacific group, the South Pacific Forum, was created in 1971. Without formal structure or a permanent secretariat, the Forum of 15 states² meets annually in different capitals throughout the region. Like the South Pacific Commission, the Forum has been involved in adopting recent regional instruments concerning the Pacific region. The South Pacific Forum has taken the lead on the issue of nuclear testing and dumping of radioactive wastes, a matter of particular concern in the region. Australia introduced the idea of a Pacific nuclear-free zone at the 14th meeting of the Forum in 1983. The 15th Forum in 1984 adopted the proposal leading to the South Pacific Nuclear Free Zone Treaty (Raratonga, Aug. 6, 1985). The Treaty of Raratonga prohibits the testing, manufacture, acquisition, and stationing of nuclear weapons in the territory of the states parties, as well as the dumping of nuclear wastes at sea.

Another major problem for the South Pacific states has been the depletion of fishing stocks due to unregulated driftnet fishing. In November 1989, 20 Pacific states and territories met and adopted a Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Wellington, Nov. 24, 1989). Two protocols containing implementation and enforcement measures were adopted on October 20, 1990. Protocol I is open to countries that fish in the South Pacific region, while Protocol II is open to all Pacific rim states.

On the other side of the Pacific, Peru, Ecuador, Chile, and Colombia are members of the South Pacific Permanent Commission. Created in

² Australia, the Cook Islands, the Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Western Samoa.

1954, the Commission acts to protect the states' exclusive economic zones and also takes common action to protect the marine environment from pollution. In 1987, the Ministers of Foreign Affairs of the four countries declared the Commission to be the appropriate regional organization to implement measures required by UNCLOS regarding conservation and utilization of marine living resources.

The former Organization of African Unity (OAU), established in large part to stimulate the end of colonialism in Africa, considered environmental concerns from the time it was founded. Africa is home to extraordinary wildlife and the OAU took action to protect this resource through the conclusion of the African Convention on the Conservation of Nature and Natural Resources (Sept. 15, 1968), 1001 UNTS 3. The Convention calls on states parties to protect natural resources by all necessary measures, in order to ensure their conservation, utilization, and development in the best interests of the people. Art. IX calls for regulating trade in certain species. The Convention was effectively replaced in 2003 by a more ambitious treaty of the same name concluded in Maputo. See Chapter VII, Section C.2.

In 1964, the OAU adopted a Declaration on the Denuclearization of Africa. Three decades later, in 1996, in cooperation with the United Nations and the IAEA, it adopted the Treaty of Pelindaba, establishing an African Nuclear Weapons Free Zone. Art. 1 establishes the zone as comprising the African continent, island state members of the OAU, and islands considered by the OAU to be part of Africa. The Treaty bans nuclear testing and regulates the dumping of radioactive wastes within the zone. A more general agreement concerning wastes, the best known of the African agreements on pollution, is the Convention on the Ban of Import Into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, signed by all 51 members of the OAU (Bamako, Jan. 29, 1991). The Convention generally bans the import of hazardous waste generated outside Africa, calling unauthorized and illegal dumping a crime against the African continent.

Taking an innovative approach to environmental protection, the 1981 African Charter on Human and Peoples' Rights, adopted under the auspices of the OAU, was the first international human rights instrument to include the right "to a general satisfactory environment" among its guarantees. The African Commission on Human and Peoples' Rights, created by the Charter, has adjudicated several cases invoking this guarantee. See Chapter VIII, Section B.

Despite its successes and contributions to the development of international environmental law, the OAU has not maintained environmental protection as a high priority, as reflected in the new Charter of the African Union, the successor organization to the OAU, which fails to mention the environment. This lack of emphasis may be due in part to the priority given economic development in the world's poorest region,

but also may reflect a shift towards subregional and ecosystem approaches seen in the Congo Basin initiative, the Lusaka Agreement on criminal enforcement of wildlife treaties in East Africa, and the Southern African Center for Ivory Marketing.

3. Subregional and Bilateral Organizations

Subregional and bilateral treaties that are partly or wholly devoted to environmental protection frequently establish permanent agencies to assure equitable sharing and efficient utilization of resources. Generally their features are similar to those of other international organizations: governmental participation, permanent secretariats or organs, specified functions and powers. The number of such treaties is extremely high: for water resources alone there are perhaps 600 international treaties concerning over 200 river basins shared by two or more states.

On a bilateral level, numerous boundary commissions exist that exercise jurisdiction over shared natural resources. The United States and Mexico created an International Boundary Commission in 1889 to examine and settle boundary demarcation disputes. This Commission was replaced and its functions expanded in 1944 upon adoption of the Water Utilization Treaty, which established the International Boundary and Water Commission (IBWC). Treaty Relating to the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande (Feb. 3, 1944), 59 Stat. 1219, TS No. 994, 3 UNTS 313. The Commission is responsible for the application of the Treaty, the regulation and exercise of the rights and obligations that the two governments assume under the Treaty and the settlement of all disputes between the parties. The IBWC is composed of two national sections of technical engineers and legal advisors. Each section reports directly to its nation's foreign office for policy guidance. Since 1944, the IBWC has been concerned primarily with construction of flood control and municipal sewage treatment works along the border, including joint waterway management projects. The Treaty contains no substantive obligations or principles for water quality protection, and the role of the Commission has been limited; however, recent agreements have expanded its functions.

The United States and Canada also set up an International Joint Commission under the terms of the 1909 treaty for the protection of boundary waters between the two countries. The Commission is composed of six members, three named by each government. It takes its decisions by majority vote. The Commission's jurisdiction consists of a power of prior authorization for certain works, a function of consultation or inquiry, and even an arbitral role for disputes that the states agree to submit to it. However, to date, the latter power has never been utilized. In practice, the most important function of the Joint Commission has been to serve as a consultative organ. Its action led to the conclusion of the November 22, 1972, agreement on water quality in the Great Lakes.

The Canada-United States Agreement on Air Quality (Ottawa, Mar. 13, 1991) establishes a bilateral Air Quality Committee composed of an equal number of members representing each party. The Committee reviews progress made in the implementation of the agreement, including general and specific objectives; prepares and submits to the parties a progress report every two years; and refers each progress report to the International Joint Commission for action. The Air Quality Committee releases the progress report to the public after its submission to the parties. The pre-existing International Joint Commission may hold hearings on the progress reports, but shall, in any case, invite comments on the reports and synthesize these for the parties. The synthesis is also released to the public after its submission to the parties.

Finally, the environmental side agreement of the North American Free Trade Agreement set up a Commission on Environmental Cooperation (CEC), consisting of one high-level representative from each of the three parties. Canada-Mexico-United States, North American Agreement on Environmental Cooperation (Sept. 8–14, 1993). It also created a 15-member Joint Public Advisory Committee, with equal national representation. The CEC Secretariat reports regularly to the commission on the state of the environment in the three countries and on efforts to make improvements, particularly in enforcement of each country's own environmental standards. The public, as well as governmental and non-governmental organizations, may file complaints that such standards are not being applied. If the Secretariat decides that complaints show a "consistent pattern of failure" of enforcement, it can require a response from the government involved and submit a report to the Commission. If the dispute is not settled within 60 days, the Commission by two-thirds vote will appoint a five-member panel, drawn from a roster of 45 environmental experts to conduct public hearings. The panel can call for the government involved to submit an Action Plan to fix the problem. To enforce its decisions, the panel can impose fines on the offending government. If the fines are not paid, the other parties may impose sanctions of pre-NAFTA tariffs.

4. International Financial Institutions

The most important international financial institutions are the World Bank group, the Global Environment Facility (a mechanism providing developing countries with grants and concessional funding), and, at the regional level, the European Bank for Reconstruction and Development, the Inter-American Development Bank, and the Asian and African Development Banks. The legal instruments creating these institutions do not mention environmental protection, but it has become an issue in their lending policies. Today, nearly all international financial institutions support sustainable development and condition funding of devel-

opment projects on respect for the environment. They all require environmental impact assessment. Chapter VI, Section A.1.

Since the beginning of the 1990s most financial institutions have created specific procedures for selecting environmentally friendly projects and also instituted mechanisms to revise projects considered as not respecting environmental conditions. The World Bank has addressed social and environmental issues through the development of ten "Safeguard Policies" and through the work of the Inspection Panel established in 1993. In doing so, the Bank recognized the connection between economic issues and environmental degradation. In 1998, the Bank decided to reorganize its Operational Manual around related themes. Ten key environmental social and legal policies were grouped together, covering Environmental Assessment (OP 4.01, Jan. 1999), Natural Habitats (OP 4.04, Sept. 1995), Forestry (OP 4.36 Sept. 1993), Pest Management (OP 4.09, Dec. 1998), Involuntary Resettlement (OP 4.12, Dec. 2001), Indigenous Peoples (OD 4.20, Sept. 1991), Cultural Property (OP 11.03, Sept. 1986), Safety of Dams (OP 4.37, Sept. 1996), International Waterways (OP 7.50, Oct. 1994), and Projects in Disputed Areas (OP 7.60, Nov. 1994). Disclosure of Information applies to all ten safeguard policies according to the new Disclosure Policy, which came into effect in January 2002. During the 1980s, environmental concerns also were integrated into the World Bank's activities through establishing an environmental department in all four of the regional divisions of the Bank.

Bank lending for environmental projects has grown substantially in recent years. In addition to funding environmental projects, the Bank provides technical and legal environmental assistance to developing countries, in particular by helping in the development of Country Environmental Strategies and planning coordinated responses to address regional environmental problems, mainly in Central and Eastern Europe.

The World Bank established the Inspection Panel in 1993 because of growing concerns about the accountability of it and other international development agencies in supporting projects and programs. The Panel is an independent investigatory body that can receive complaints issuing from those in the territory of a borrower whose rights or interests have been adversely affect by the Bank's failure to comply with its policies and procedures in the design, appraisal, and implementation of a Bank-financed project. The Panel may investigate these complaints upon authorization by the Bank Board of Executive Directors and assess to what extent the Bank has complied with its standards. The process can result in a remedial Action Plan requiring management to take actions in response to Bank failures. Two outside reviews have led to clarifications and changes in the operation of the Inspection Panel. The first review, done in 1996, focused on procedure. The Second Inspection Panel Review, completed in 1999, added to and revised the 1996 conclusions. See *Conclusions of the Second Review of the World Bank Inspection Panel*, 39 ILM 243 (2000). Efforts to extend the Inspection Panel to private-sector funding were opposed by the

relevant institutions (International Finance Corporation (IFC))/(Multilateral Investment Guarantee Agency (MIGA)) who instead appointed a Compliance Adviser/Ombudsman with different terms of reference, a more flexible confidential procedure and emphasis on mitigating damage. The cooperation of the Bank and the private IFC means that, in some instances, both procedures may apply to a single project, e.g., the Chad/Cameroon Pipeline and the Bujagali Hydropower Project in Uganda.

The World Bank is also involved in administering the Global Environment Facilities (GEF). The Global Environment Facility is the primary mechanism providing developing countries with “new and additional grants and concessional funding to meet the agreed full incremental cost of measures to achieve global benefits,” as required by various multilateral environmental agreements. In particular, funding is intended to address four environmental issues: climate change, stratospheric ozone depletion, loss of biological diversity, and pollution of international waters. The costs of activities relating to land degradation, particularly desertification and deforestation, are also eligible for funding “insofar as they achieve global environmental benefits by protecting the global environment in the four focal areas.” The GEF operates as the financial mechanism under the Climate Change Convention, the Convention on Biological Diversity, the Desertification Convention, and the POPs Convention. See *Instrument for the Establishment of the Restructured Global Environment Facility* (1994), 33 ILM 1273 (1994).

GEF, launched in 1991 for a three-year pilot phase, was restructured and made permanent in 1994. It is governed by an Assembly, a Council, and a Secretariat. The Assembly consists of representatives of 160 countries; it meets every three years to review and revise the GEF’s general policy and operations. The Council consists of 32 members representing constituency groups; it has primary authority for developing, adopting, and evaluating the operational policies and programs for GEF-financed activities. It also reviews, approves, and monitors the implementing agencies’ work program. The Secretariat is located at the World Bank, which provides administrative support, but the GEF is supposed to be functionally independent. The World Bank, the UN Environment Program (UNEP), and the UN Development Program (UNDP) are the GEF’s “Implementing Agencies.” They are accountable to the Council for their GEF-funded activities. The World Bank administers the funds, while UNDP funds institution-building, training, and other technical assistance projects. UNEP ensures consistency with international environmental agreements, funds a small number of research projects related to GEF issues, and supports the independent Scientific and Technical Advisory Panel.

C. THE PRIVATE SECTOR

During much of international legal history, non-state entities were considered to lack international legal competence and had few roles to play.

A transformation of the international system occurred in the 20th century with the emergence of non-state actors, including non-governmental organizations, multinational companies, and individuals. The role of transnational civil society has been particularly important in the evolution of international environmental law. At the beginning of the 20th century, the relatively homogenous character of the international order gave way to an international system comprised of a highly diverse and enlarged group of states, international institutions, and non-state actors, which increasingly have taken part in making and applying national and international norms. Today, purely interstate development of norms is probably non-existent in most fields of international law. It is also rare to find purely private standard-setting. The modes of interaction between state and non-state actors may be particularly important to achieving compliance with environmental norms, as a participatory process can enhance the legitimacy and authority of the norms adopted.

The communications revolution that introduced faxes, the Internet, and electronic mail has allowed environmental activism to move beyond formal NGOs to create grass-roots networks and campaigns that may be limited to a single project or may form around a larger issue. This dynamic process can result in powerful movements that force governments to consider public opinion beyond their borders, creating change in many parts of the world. The notion of an international civil society is now widely recognized and seen as a process of directly channeling public participation to private actors in policymaking and implementation. Political discourse across borders helps shape common interests and the identities of societies.

Beginning with the Stockholm Conference, the crucial role of economic and other non-state actors in achieving environmental protection has become increasingly recognized. Representatives of the private sector emerged as powerful new actors in the international law-making process during the preparations for the Rio Conference and in the negotiation of treaties. They have contributed to the elaboration of a legal regime for the global environment by participating in the meetings as observers, bringing and dispatching information, and even taking part in the drafting of important international agreements, assisting official state delegations, and, on occasion, being included in them. Enterprises have become more responsive to public pressure and insurance requirements, and have sometimes developed environmental consciousness. Parallel to this evolution, states and intergovernmental organizations have utilized more and more innovative economic incentives in environmental protection, such as labeling, standardization, environmental auditing, use of the best available techniques and environmental practices to induce change in the behavior of the private sector.

Business interests and industry have sometimes contributed to the development and implementation of international environmental law. They

were especially important in the elaboration of the Vienna Convention and Montreal Protocol on the Ozone Layer. Chemical companies supported the ozone regime by rapidly developing chemical alternatives to ozone-depleting substances. The insurance sector has undertaken advanced research on climate change and supported action to curb greenhouse gas emissions. Representatives of the tourist industry have participated in consultative meetings of the Antarctic Treaty system and the drafting of a liability annex to the Antarctic system's Madrid Protocol on Environmental Protection. At COP-7 of the Framework Convention on Climate Change, held in Marrakesh at the end of 2001, the overwhelming majority of accredited private parties represented the energy sector, coal and steel producers, the chemical industry, and other business interests.

The issue of corporate responsibility under international law has also become a growing issue. Globalization and deregulation has created powerful non-state actors that may violate international law in unprecedented ways. This development poses challenges to international law, because, for the most part, that law has been designed to restrain abuses by powerful states and state agents, not to regulate the conduct of non-state actors themselves. The international community has responded both by encouraging self-regulation by the business sector and by attempting to draft international standards of conduct. On the domestic level, transnational litigation against corporate environmental harm has increased.

Several developments have led corporations and other business organizations to place international standards of environmental protection on their agendas. Consumer awareness of corporate responsibility has increased along with demands for transparency and accountability. Some corporations have been publicly implicated in serious environmental incidents and have found themselves subject to consumer boycotts, loss of market share, and litigation. In sum, respect for the environment has become one of the key performance indicators for at least some corporations around the world.

During the 1970s many developing countries supported a multilateral effort to draft principles to regulate international trade and investment. The locus of the effort was the UN Commission and Center on Transnational Corporations, which were established by ECOSOC in November 1974. In 1975 the Center began work on a Code of Conduct for Transnational Corporations and prepared numerous studies in connection with this work. In the meantime, developed countries prepared their own pro-investment principles under the auspices of OECD, issuing a Declaration on International Investment and Multinational Enterprises, to which were annexed Guidelines for Multinational Enterprises, amended in 2000 and reprinted at 40 *ILM* 237 (2000). In 1985, the UN Center concluded that a code of conduct was needed and the Commission itself reached agreement in 1990 on a draft code. The draft was submitted to the General Assembly, but, after informal consultations, it was concluded that no consensus was possible on the issue, and the effort to adopt a global code failed.

In the past decade, the United Nations reinvigorated the issue of corporate social responsibility through a set of principles known as the Global Compact, which originated in 1999, when UN Secretary-General Kofi Annan encouraged business leaders to adhere to policies that ensure responsible forms of globalization. In announcing the Global Compact, he urged corporations to increase transparency and integrate social responsibility into their business operations. The principles address human rights, labor standards, the environment, and combating corruption.

The most recent international attempt to articulate the proper relationship between business and human rights is the Norms on the Responsibilities of Transnational Corporations and Other Business Enterprises with Regard to Human Rights, adopted by the Subcommission on the Promotion and Protection of Human Rights in 2003. UN Doc. E/CN.4/Sub.2/2003/12/Rev.2 (2003). The Norms call on corporations and other business enterprises to recognize and respect applicable norms of international law as well as those of national law. Paragraph 14 addresses environmental protection:

Transnational corporations and other business enterprises shall carry out their activities in accordance with national laws, regulations, administrative practices and policies relating to the preservation of the environment of the countries in which they operate, as well as in accordance with relevant international agreements, principles, objectives, responsibilities and standards with regard to the environment as well as human rights, public health and safety, bioethics and the precautionary principle, and shall generally conduct their activities in a manner contributing to the wider goal of sustainable development.

International corporate standards become important evidence in transnational litigation of emerging customary law. The U.S. Alien Tort Statute (ATS), 28 U.S.C. § 1350, provides that the federal courts have jurisdiction over actions brought in tort by an alien for violations of a treaty of the United States or the law of nations (customary international law). In 2004, the U.S. Supreme Court for the first time interpreted and applied this statute in the case of *Sosa v. Alvarez Machain*, 124 S. Ct. 2739 (2004). In so doing, the Court briefly addressed some issues of corporate liability for international law violations outside the United States. The Court stated that “the determination whether a norm is sufficiently definite to support a cause of action” is “related [to] whether international law extends the scope of liability for a violation of a given norm to the perpetrator being sued, if the defendant is a private actor such as a corporation or individual.” Several cases have been brought against corporations in recent years under the Alien Tort Act alleging environmental harm and other illegal acts abroad. See *Doe v. Unocal Corp.*, 2002 WL 31063976 (9th Cir. 2002)

(upholding a complaint under ATS against Unocal); *Aguinda v. Texaco, Inc.*, 303 F.3d 470 (2d Cir. 2002); *Sarai v. Rio Tinto*, 221 F. Supp. 2d 1116 (C.D. Cal. 2002). *Doe v. Unocal* was settled; the other cases remain in litigation.

D. PUBLIC INTEREST ORGANIZATIONS

NGOs formed to advance the interests of their members have long existed, but their numbers have grown considerably along with their ability to participate in international events. An estimated 275,000 NGOs operate in the United Kingdom alone. Environmental groups emerged due to frustration with governments' lack of initiative to address the extent of environmental degradation, while the communications revolution has made it possible to connect the global community efficiently and inexpensively. In the past two decades, environmental NGOs have developed scientific expertise and lobbying skills that allow them effectively to participate in negotiations for environmental agreements. Some of the environmental NGOs have become well known for their work on a global basis: IUCN, Friends of the Earth, Greenpeace International, and the World Wide Fund for Nature (WWF). Thousands more work nationally or transnationally, sometimes on single issues, at other times with broad mandates. Many NGOs act within international institutions, seeking to influence international decisionmaking, as well as within states, where they promote positive environmental policies. They represent their members in advancing their common values.

Like individual members of the public, NGOs may compile data, seek to influence legislation, intervene in decisions on licensing or permitting projects, and monitor compliance with environmental laws. With these roles and because of their greater means, expertise, and organized efforts, NGOs often can effectively assert public rights of information and participation. Their assets include access to funds, media attention, and the ability to acquire, communicate, and disseminate expert information. Most importantly, many of them possess a reputation as environmental defenders. That reputation and their transnational character give them influence and permit them to push the transparency of international institutions as they frame issues, build communities, and set examples, at their best becoming moral agents of change. Increasingly, too, they have become aware of their own needs for transparency and are becoming more public about funding sources, membership, and other governance issues.

Many NGOs obtain formal status in international institutions. Art. 71 of the UN Charter provides that the Economic and Social Council may extend "consultative status" to international NGOs that satisfy criteria established by the United Nations. Such status entitles an NGO to access to UN meetings and conferences, and, in some instances, the right to intervene orally and submit written statements. NGOs were prominent at the 1992 Rio Conference, where some 1,500 NGOs were accredited to attend for-

mal and some informal meetings. They lobbied, presented documents, and met among themselves. NGOs also were present during the drafting of the Kyoto Protocol and have been afforded widespread observer status in other international environmental treaty negotiations. They increasingly have a role in launching international inquiries.

In addition to their formal role, NGOs act outside institutions to mobilize public opinion, exposing environmental harm and setting environmental agendas. Globalization may enhance the power of NGOs to mobilize effective consumer actions. Non-governmental organizations may draft or develop norms either for their own governance or for submission to states for adoption. NGOs also perform monitoring, information gathering, and other functions related to compliance with binding and non-binding norms. In practice, most non-binding international norms—indeed most binding international norms—are not drafted by one type of international actor independently of all others but, instead, are adopted through a complex interplay of state and non-state actors.

On rare occasions, an NGO serves as the secretariat for an intergovernmental treaty, e.g., IUCN in regard to the Ramsar Convention on Wetlands of International Importance. Other non-governmental bodies serve as experts in treaty administration, such as the Scientific Committee on Antarctic Research of the International Council of Scientific Unions in regard to the Antarctic Treaty system. NGOs may be afforded an official role in regard to monitoring and compliance. Unofficially, most of them serve as “watchdogs” in the process of adoption and implementation of international environmental law.

Several examples illustrate the important role of NGOs in the development of and compliance with international norms and standards. IUCN elaborated the World Charter for Nature and pressed the United Nations to adopt it. The International Law Association drafted the 1966 Helsinki Rules on the Uses of the Waters of International Rivers, which provided the basis for several treaties on international waterways. See, e.g., Agreement between the Government of the Republic of Namibia and the Government of the Republic of South Africa on the Establishment of a Permanent Water Commission (Noordoewer, Sept. 14, 1992), 32 ILM 1147 (1993).

During the negotiations for the Kyoto Protocol, more than 200 NGOs were accredited as observers. The expanded functions of NGOs can be seen in the Rules of Procedure of the Permanent Committee of the Bern Convention. It authorizes oral declarations and written submissions by NGOs; their propositions may be the subject of a vote if requested by a delegation (Art. 9 Rules of Procedure). Going further, the Mediterranean Commission on Sustainable Development, created in 1995, comprises 36 delegates, of which 21 represent states and 15 come from environmental NGOs. They sit on a basis of equality. It is, however, only a consultative organization in which there is no vote.

Given their expanded functions, NGOs sometimes form alliances among themselves and with intergovernmental organizations to help implement international environmental law. In the early 1980s, the World Wide Fund for Nature, IUCN, and UNEP formed the World Conservation Monitoring Center to collect and provide information services on conservation and sustainable use of biological resources. The Monitoring Center now provides data management services for the CITES Secretariat, the World Heritage Convention, the Convention on Biological Diversity, the Convention on Migratory Species and the Ramsar Convention. Centralizing conservation data allows the Center to work with the secretariats of the five major biodiversity treaties to harmonize reporting and management of information.

Finally, NGOs may be able to participate in dispute settlement procedures, either as parties, or as *amicus curiae*. In the U.S. shrimp/turtle case at the World Trade Organization, NGO briefs initially were attached as exhibits to the U.S. submission, but a revised version of one of the briefs was submitted independently by a group of NGOs and was accepted by the panel, despite protests of some governments.

Chapter IV

Multilateral Environmental Agreements

“Conventional norms” or treaties concerning the environment now number more than 1,000, although many agreements contain only a few provisions related to the topic. The 1967 Outer Space Treaty, for example, contains only one relevant provision, Art. IX, which concerns protecting the earth against pollution from outer space and, in turn, protecting outer space from earth-source contamination. Hundreds of other treaties, however, are exclusively devoted to environmental protection; the major ones are listed in Appendix B.

International environmental treaties are characterized by the degree to which states parties must regulate the behavior of non-state actors that are the source of most harm to the environment. Previously, most treaties, such as those to establish diplomatic relations or to lower trade barriers, primarily applied to the conduct of state authorities.

The geographic coverage of environmental treaties varies widely. Some instruments aim to regulate the entire international community. Art. 35(3) of Protocol I to the 1949 Geneva Conventions Relative to Protecting Victims of International Armed Conflicts, for example, prohibits all states engaged in such conflicts from employing methods or means of warfare that are intended, or may be expected to cause widespread, long-term, and severe damage to the natural environment. The London conventions of 1972 and 1973 concerning pollution of the high seas and the Convention on International Trade in Endangered Species similarly have global reach. These treaties illustrate the broad framework of international law that has been established for the protection of water, soil, the stratosphere, and biological diversity.

Global norms often are more effective when implemented and enforced regionally. The law of the sea, for example, has been adapted and reinforced for some two dozen different maritime regions around the world,

including the Mediterranean, Persian Gulf, West Africa, South-East Pacific, Red Sea, Gulf of Aden, Caribbean, and East Africa. In these areas, regional seas conventions have been concluded, which rely on the same principles and generally include the basic norms previously articulated in global instruments. At the same time, the agreements take into consideration the different ecological conditions in each regional sea.

The regional approach is motivated by the similarity of the geography and environment among neighboring states bordering regional seas and is enhanced in many cases by like economic, cultural, and political conditions. Regional economic cooperation in part enhances regional cooperation on environmental matters because of a desire to avoid market distortions and competitive disadvantage for states with high environmental standards.

As it has grown, the field of international environmental law has developed some innovative features that contrast with other areas of international regulation. Environmental treaties, in particular, have developed a set of unique common characteristics that often include: (1) an absence of reciprocity of obligations, (2) interrelated or cross-referenced provisions from one instrument to another, (3) framework structures, (4) interim application, (5) institutions with expansive mandates, (6) innovative compliance and non-compliance procedures, and (7) simplified means of modification or amendment.

A. NEGOTIATIONS

No uniform procedure governs the negotiations of MEAs, but a relatively common practice has emerged in responding to identified problems, after interest is expressed by a group of states. Usually an international organization or one of its organs, like UNEP, will provide a forum. Sometimes a special conference is called for this purpose, or a negotiating committee is established to prepare a preliminary text. Governments may draft their own negotiating texts as well. Government delegates work on instructions from home, but sometimes, delegations include representatives of the private sector. In addition or in the alternative, non-state actors may be accredited to the meeting as observers. Whenever possible, agreement is reached by consensus, but when agreement proves impossible to achieve, a vote may be taken. With major law-making treaties, negotiations may be very lengthy—the drafting of UNCLOS took over ten years to complete.

Since the beginning of the 1970s, an increasing number of international treaties have been adopted in several phases of negotiations. The technique of “framework conventions” means that a convention of general scope is first adopted, proclaiming basic principles on which consent can be achieved. The parties foresee on-going negotiations leading to the elab-

oration of separate agreements, called protocols, containing more detailed obligations.

This method first was used in regional seas agreements, beginning with the 1976 Convention for the Protection of the Mediterranean Sea against Pollution. Regional seas conventions state the basic principles that the contracting parties are to apply. Detailed regulations are set forth in additional protocols, some of which are signed at the same time as the principal instrument. Others are elaborated later. Most regional seas treaty systems also draft development plans for the concerned region. The 1979 Geneva Convention on Long-Range Transboundary Air Pollution similarly created a legal structure for subsequent negotiations that drafted a series of protocols detailing the content of the general obligation contained in the main treaty. The Convention for the Protection of the Ozone Layer and the Framework Convention on Climate Change also adopted the approach.

Framework agreements have the advantage that consensus on the basic principles and the need for action generally is easier to reach than is agreement on the necessary action itself, which often has a technical character. Further negotiations can elucidate these measures with the cooperation of scientists, representatives of economic interests, and civil society. New elements can be incorporated as well, as exemplified by the Montreal Protocol on the Protection of the Ozone Layer, which reflects the discovery of the ozone "hole" above Antarctica after the Vienna Convention was adopted. Framework treaties are particularly well adapted to the needs of environmental protection, which sometimes must respond quickly to changes in knowledge and even basic concepts.

B. STRUCTURE

Each international environmental agreement contains legally binding rules, although unlike most traditional treaties, there may be few precise duties or details set forth in the text. Instead, the provisions indicate areas of cooperation, or aims to be reached and, in some cases, the means states parties should adopt to achieve the goals of the treaty. Environmental treaties that do contain precise obligations often invade traditional spheres of government activities by requiring states to limit pollution emissions, establish licensing systems, regulate and monitor waste disposal, control the export and import of endangered species and hazardous products, and enact penal legislation. Such treaties usually set forth the obligations in general terms, however, and require completion through internal legislative or executive action. For countries like the United States that distinguish between self-executing and non-self-executing treaties, such treaties fall within the latter category, although it is more common to find treaties containing a mixture of self-executing and non-self-executing obligations. Thus, individual treaty provisions must be analyzed, rather than the agreement as a whole.

An environmental agreement, like most treaties, will begin with a preamble that enunciates the foundations of the text and the background leading to the negotiations. A preamble often provides important contextual references for interpreting the obligations and understanding the object and purpose of the agreements. The opening article in the body of the treaty usually sets out the specific aims of the drafters and objective to be reached. The statement of objectives is often followed with an article defining key terms in the agreement. The CBD, for example, defines its subject matter as follows:

[B]iological diversity means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

CBD, Art. 2. Pollution, waste, endangered species, protected area, and other relevant terms usually can be found in the definitions (and in the glossary herein, Appendix C).

The operative parts of the treaty specify the rights and duties of the states parties. In many instances, these are obligations of result, leaving it to the state to adopt the means to achieve the goals. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn, June 23, 1979), Art. 3(5), for example, requires that states in the migratory areas of animals listed in Convention Annex I forbid the taking of any of these animals, leaving it to the states to achieve the result through legislation, regulation, executive order, or other means. Art. 8 of CITES similarly provides:

1. The Parties shall take appropriate measures to enforce the provisions of the present Convention and to prohibit trade in specimens in violation thereof. These shall include measures:
 - a) to penalize trade in, or possession of such specimens, or both; and
 - b) to provide for the confiscation or return to the State of export of such specimens.

It is also common for environmental treaties to require a state to enact and enforce domestic legislation. Art. 4 of the International Convention for the Prevention of Pollution from Ships (MARPOL) (London, Nov. 2, 1973), requires states parties to prohibit and sanction any violation of the requirements of the Convention and to bring proceedings against any ship that commits a violation or furnish evidence to the state administering the ship. The penalties adopted by the state “shall be adequate in severity to discharge violations of the present Convention and shall be equally severe irrespective of where the violations occur.” States also may be called upon to designate or create organs to be entrusted with certain functions, such

as maintaining contacts with the authorities of other states parties or issuing licenses or authorizations for regulated activities.

The next part of a treaty is usually devoted to establishing institutions and procedures for supervising state compliance with the treaty obligations and for resolving disputes between states parties. The institutional aspects are discussed in Section D; compliance and dispute settlement procedures appear in Sections E and F.

Finally, a treaty usually contains a series of provisions called “Final Clauses” that govern amendment, ratification, reservations, entry into force, and that designate the depository for official texts related to the agreement.

C. COMMON PROVISIONS AND CHARACTERISTICS OF MEAs

International environmental agreements characteristically include articles based on the principle of common but differentiated obligations, instead of the traditional identity of rights and obligations among states parties. Legal obligations reflecting the principle of common but differentiated responsibilities have been incorporated in all global environmental conventions adopted since the end of the 1980s, often reflected in provisions calling for transfer of technology and provision of financial assistance. See Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Art. 10(2) (Basel, 1989); Montreal Protocol on the Protection of the Ozone Layer as amended in 1992; Convention on Biological Diversity, Arts. 16, 20, and 21 (1992); and the UN Framework Convention on Climate Change (1992). While the principle is widely accepted, some states have raised objections to the abandonment of equality of obligation. The U.S. Senate, for example, directed the U.S. President to reject the Kyoto Protocol, because it failed to impose equal obligations on developing and developed countries to reduce greenhouse gas emissions.

Another characteristic of international environmental agreements results from the problem of “free riders.” To the extent that international environmental agreements provide generalized benefits to the global environment while imposing costs on the states parties that comply with them, it is necessary to include measures to discourage free riders and provide incentives to adherence and compliance. Thus, several major environmental agreements contain measures designed to impact the behavior of non-parties. CITES and the Montreal Protocol, for example, require parties to restrict imports from non-parties unless the latter effectively complies with the provisions of the agreement. The Antarctic Treaty also contains an obligation on states parties to see that “no one” acts inconsistent with the principles and purpose of the Treaty. Art. X. Such provisions are almost unique to the environmental field in international law.

The final clauses in MEAs generally include provisions on amendments to the treaty. The ability to adapt measures to changes in conditions or knowledge is one of the principal needs of environmental law, both internal and international. Marine or river pollution may increase due to the appearance of new substances or new means of production or consumption, or a species of wildlife may risk extinction due to new threats that develop before international rules can be adopted or existing rules amended.

It must be questioned how law, which is based upon predictability and the constancy of rules, can respond to the needs of environmental protection. In addition to using the technique of framework conventions, which can be rapidly supplemented, states have developed an effective response by drafting treaties that establish stable general obligations but also add flexible provisions, especially those prescribing technical norms. The latter may designate the specific products that cannot be dumped or discharged in a given area or may identify the endangered species needing additional protection. The general obligations are set forth in the body of the treaty, which remains stable, while the detailed listing of products or species is reserved to annexes that can be modified easily without amending the principal treaty. The modification procedure must be expressly included in the treaty's provisions, because annexes form an integral part of the treaty and thus are legally binding.

Agreements of this type include the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats (Sept. 19, 1979). Its Art. 16 allows for amendment of the treaty according to generally recognized international rules codified in Arts. 39 and 40 of the Vienna Convention on the Law of Treaties. In other words, any amendment must be accepted by all the contracting parties according to their internal constitutional requirements. In contrast, the Treaty's annexes listing protected species may be modified pursuant to the procedure set forth in Art. 17, which allows changes to be proposed by a permanent Committee established by the Convention. Proposals are communicated to the contracting parties, and, at the expiration of three months, each modification enters into force for all states that have not filed objections.

Other treaties establish similar flexible procedures. Formal approval rather than tacit acceptance is required by Art. 9 of the 1972 London Convention for the Conservation of Antarctic Seals (June 1, 1972), but it is more common to provide for formal approval followed by automatic entry into force after a certain period of time for states that have not voiced opposition. See, e.g., Art. 15 of the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Dec. 29, 1972). States thus must opt out of obligations, rather than affirmatively expressing their approval and agreement to be bound. In sum, these treaties establish a bifurcated modification process in which the

structural parts of the treaties are subject to traditional, rather difficult, amendment processes, while the technical details may be altered quickly and less formally, in many cases requiring states to affirmatively opt out of any changes made.

Finally, many broad law-making treaties, such as UNCLOS, prohibit reservations requiring states to accept them in their entirety. This is understandable in treaties that codify customary international law, which is binding independently of the treaty, but most environmental agreements cannot claim to be codifications of customary law. Instead, the absence of reservations may reflect the give and take of a multilateral negotiating process where decisions are based upon consensus and bargains. The process would unravel if states could pick and choose their obligations after the fact.

D. TREATY BODIES AND THEIR FUNCTIONS

Environmental protection treaties typically grant supervisory powers and other functions to international organs. Sometimes new mandates are conferred to already-existing international organizations. The MARPOL Convention, for example, gives the International Maritime Organization (IMO) competence to receive information from governments on action taken regarding any violation of the Convention by a ship (Arts. 4(3) and 6(4)), and to obtain reports on incidents involving harmful substances (Art. 8), the details of laws, procedures, and national authorities concerned with implementation of the Convention (Art. 11), as well as the results of investigations on polluting accidents (Art. 12). IMO also plays a role in the administration of the Convention, in the amendment procedure, and in the promotion of technical cooperation. These numerous functions can be regrouped under three headings: managing the Convention, gathering and diffusing information, and supervising enforcement of the Convention's norms by states parties.

MEAs also often create new organizations to serve the special needs of the agreement, particularly in the field of regional or subregional cooperation. Such bodies have been created to assure permanent cooperation among contracting parties to treaties concerning, e.g., inland waters, the oceans, and the protection of wildlife. As a general rule, these organizations are lightly structured; some do not have permanent secretariats or the secretariat functions are handled by another existing intergovernmental or non-governmental organization.

The common pattern of MEA institutions includes a plenary Conference or Meeting of the Parties (COP or MOP), a secretariat, and scientific committees or other subsidiary commissions. Art. 7(2) of the Framework Convention on Climate Change is typical in providing the mandate for its COP:

The Conference of the Parties, as the supreme body of this Convention, shall keep under regular review the implementation of the Convention and any related legal instruments that the Conference of the Parties may adopt, and shall make, within its mandate, the decisions necessary to promote the effective implementation of the Convention.

Art. 7 goes on to grant a number of specific powers to the COP: periodically examine the Convention and institutions to keep them current; promote and facilitate the exchange of information on and coordinate implementation of the Convention by parties; promote development and refinement of scientific methodologies relevant to the Convention; undertake compliance review; adopt and publish reports on implementation; mobilize financial resources; establish subsidiary bodies and review their reports; adopt rules of procedure for all bodies; seek and utilize appropriate services and cooperate with other international organizations and non-governmental bodies; and “exercise such other functions as are required for the achievement of the objective of the Convention as well as all other functions assigned to it under the Convention.” The Convention thus confers broad regulatory competence on the COP. In addition, COPs often draft and adopt additional protocols completing the main treaty; this function may constitute one of the most important contributions of COPs to achieving the goals of the concerned treaty.

Several conventions invest their COPs with the power to adopt amendments to the convention or make adjustments according to a special procedure that does not involve a new instrument requiring ratification, allowing the convention to be adapted more easily to new circumstances. Treaty organs thus may act in a quasi-legislative capacity. The domestic law impact of such decisions of COPs and MOPs is an unsettled issue, at least in the United States. In August, 2006, a D.C. Circuit panel held that decisions by parties to the Montreal Protocol to regulate the use of methyl bromide were not “law” within the meaning of the Clean Air Act and were thus not enforceable in federal court. The court added that if such decisions were legally binding, this would raise serious constitutional questions. Thus, the court ruled that the Protocol created an on-going international political commitment, rather than a delegation of law-making authority to the Meeting of the Parties. *Natural Res. Def. Council v. Env’tl. Prot. Agency*, 464 F.3d 1 (D.C. Cir.) (petition for rehearing *en banc* filed Nov. 17, 2006).

The crucial function of reviewing state party implementation of obligations is usually based on reports submitted by the states parties and other public information concerning measures that the parties have taken in order to ensure the effectiveness of the provisions of the agreement. In some cases, COPs discuss information provided by NGOs or even individuals.

The meetings of COPs are often open to participants other than representatives of the contracting parties, and the trend is towards greater

openness. This helps ensure the transparency of the work of COPs and cooperation with intergovernmental bodies, as well as with non-state actors.

The treaty itself or the COP usually creates subsidiary bodies to ensure the functioning of the treaty between sessions and to facilitate state implementation of the convention. Secretariats assist the COPs by collecting national reports on compliance by domestic authorities. In some cases, they can also accept information on compliance submitted by other governments, NGOs, and/or individuals. They transmit to the COP such reports and information but sometimes they elaborate a synthesis of the national reports and information on implementation. Secretariats also may assist states parties to implement the Convention. Secretariat services may be provided by existing international bodies like UNEP, which provides the secretariat for the Convention on Biological Diversity, CITES, and the Basel Convention. More frequently, however, environmental agreements establish their own secretariat, sometimes after a transitory period.

E. COMPLIANCE PROCEDURES

The traditional practice whereby each state party to a treaty monitors whether or not other states parties comply with the requirements of the agreement remains basic to environmental agreements. According to the Basel Convention on Transboundary Movement of Hazardous Wastes, for example, each party suspecting a breach is to inform the Secretariat and the offending party. The Secretariat, in turn, informs other parties. MEAs also frequently establish their own international supervisory mechanisms or designate specific states as having supervisory functions. UNCLOS Art. 218 provides, for example, that when a ship voluntarily enters a port or offshore installation, the port state can investigate and, where the evidence warrants, institute proceedings regarding any maritime discharge in violation of applicable international rules and standards.

The compliance procedures for MEAs are most often informational. MEAs routinely contain an obligation for the parties to report on their measures of implementation and compliance. The procedure requires states parties to a treaty to address periodic reports to an organ established or designated by the treaty, indicating the implementing measures they have taken. Most global MEAs and many regional ones use this technique, but only in a few cases is state reporting part of a comprehensive system to promote compliance or one that results in enforcement measures.

Reporting must be distinguished from mere exchange of information or occasional communication of factual or scientific information not necessarily related to the implementation of environmental agreements. Reports on the implementation of MEAs usually include two categories of information. First, they summarize or transmit the legal and administrative instruments that states parties adopted or intend to adopt in order to implement the agreement. Second, they transmit factual information,

mostly scientific data, on the status of a given component of the environment, on its deterioration or threats to it, and, in some instances, the proposed remedies.

In addition to periodic reports required by treaty provision, a contracting party or, often, the MEA secretariat may request information from a party, mainly concerning facts or measures taken and planned to be taken on matters included in the MEA. See, e.g., Arts. 10 and 12 of the Convention on Cooperation for the Protection and Sustainable Use of the Danube River (Sofia, June 29, 1994). Such information may be legally protected when it is related to industrial and commercial secrets or other confidential sources. *Id.*, Art. 13. Public information also may complement state reports.

State reporting on the implementation of MEA obligations gradually emerged. One of the earliest treaties, the Ramsar Convention on Wetlands of International Importance (Feb. 2, 1971), did not foresee a reporting procedure, but it was created by COP Recommendation 2.1, adopted in 1984. The UNESCO Convention for the Protection of the World Cultural and Natural Heritage (Paris, Nov. 16, 1972) was one of the first MEAs to include a reporting obligation. Article 29 provides that the states parties to the Convention shall submit reports to the General Conference of UNESCO, in which they give information on the legislative and administrative provisions that they have adopted and any other action, which they have taken for the application of the Convention, together with details of the experience they have acquired in this field. Most of the MEAs adopted since 1972, whether global or regional, provide for reporting by states parties on their implementation.

The content of the periodic reports can be specified by the MEA itself or, more frequently, may be detailed by a treaty body. COPs or secretariats often prepare models for national reports including questionnaires and directives for the presentation of information. CITES was one of the first MEAs to prescribe precise rules on reporting. Annual reports should contain a summary of the number and type of permits and certificates of export and import granted, the states with which such trade occurred, the numbers or quantities and types of specimens, names of species included in one of the appendixes and, where appropriate, the size and sex of the specimens in question. Moreover, a biennial report must be prepared on legislative, regulatory, and administrative measures taken to enforce the provisions of the Convention. Such information shall be available to the public where this is not inconsistent with the law of the party concerned.

The obligation to address reports to an organ designated by an international instrument would be of little utility if the reports were not subject to review and critique. Thus, the mandates of treaty bodies typically include review of state reports. In the framework of the Convention on Long-Range Transboundary Air Pollution (Geneva, Nov. 13, 1979), the Executive Body of the Convention established an Implementation

Committee, whose functions include review of compliance by the parties with their reporting obligations. Parties to the Treaty's Protocols are required to submit two types of information: information on strategies and policies that serve as a means of reducing emissions and information on emissions. With regard to information on strategies and policies, the Committee reviews both the timeliness and completeness of reporting.

The Stockholm Convention on Persistent Organic Pollutants (May 22, 2001), follows the article on required state reporting with provisions concerning an effectiveness evaluation. Art. 16 foresees that the Conference of the Parties shall periodically evaluate the effectiveness of the Convention on the basis of comparable monitoring data on the presence of chemicals listed in annexes. The evaluation is based on state reports, as well as other reports and monitoring information.

Secretariats of MEAs often play a role in reporting systems, but the importance of their functions differs from one treaty to another. The 1979 Convention on Long-Range Transboundary Air Pollution provides that the Secretariat of the Convention synthesizes the information it has received, including data in annual state reports on the level of national sulphur emissions and the bases on which they are calculated. It analyzes the reports received in order to establish its annual report, but has no possibility to verify the data submitted, to ask for further information, or to make independent assessments.

In contrast, Art. XII(2)(d) of the 1973 Washington Convention on the International Trade of Endangered Species empowers the Secretariat to study the state reports and to request from parties such further information as it deems necessary to ensure implementation of the Convention. It also may invite the attention of the parties to any matter pertaining to the aims of the Convention. When the Secretariat is satisfied that any species protected under the Convention is being affected by trade or that the provisions of the Convention are not being effectively implemented, it is mandated to communicate that information to the authorized Management Authority of the party or parties concerned. Art. XIII.

A UN study undertaken in the context of human rights reporting sets forth the objectives of international reporting procedures. *Report of the 3d Session of the UN Committee on Economic, Social and Cultural Rights, E/1989/22, Annex III.* It is equally relevant to MEA reporting. It says that the reporting procedure should ensure that states parties undertake a comprehensive initial review of national legislation, administrative rules, and procedures and practices, either before or soon after ratification, and regularly monitor the actual situation with respect to each of the obligations, to become aware of the extent to which the various duties are, or are not, being fulfilled. It also should facilitate public scrutiny of relevant government policies, encouraging the involvement of various sectors of society in the formulation, implementation, and review of national policies. On the international level, the procedure should provide a basis for the state

party, as well as the supervisory body, to evaluate effectively the progress made in the realization of the obligations contained in the treaty. The procedure can facilitate the exchange of information among state parties and develop a better understanding of the common problems faced.

Questions remain about the effectiveness of reporting systems. States tend to be less than forthcoming about problems and defects in the implementation of their treaty obligations. In response, it may be noted that even the fact of having to write a report may exercise a positive influence on state behavior, because many government officials become involved in assessing state performance against international obligations. Internationally, state reports are often discussed in the supervisory organs, and during the process independent experts or representatives of other states can question delegates from the state authoring the report. The strength of the system is both psychological and political. States may not always protect the environment as they should, but they seek to maintain a good reputation in this field where the public opinion is particularly sensitive. Thus, they normally make efforts to avoid or mitigate damage that could result in condemnation or criticism during review of their reports. The presence of NGO observers and the press at the meetings of COPs or MOPs can play a major role in this regard.

F. DISPUTE SETTLEMENT

Disputes over alleged breaches of international environmental norms may be settled through a variety of mechanisms, including mediation, arbitration, and judicial proceedings. Although recourse to formal procedures is not common, it appears to be increasing, perhaps reflecting a maturation of the normative framework. One major handicap to interstate environmental litigation is the time it requires; the *Trail Smelter* case began with the first claims presented by pollution victims in 1926, claims taken up by the government a year later. Only in 1941 was the final arbitral award rendered, in spite of the readily identifiable and attributable international harm. In addition to time, there often are special problems of defining the author and the cause of the injury, especially in complex situations, such as acid rain. Perhaps for this reason, most of the precedents are bilateral cases. In addition to the time and cost involved in any type of litigation, aggravated in an international case, there are disadvantages to an adversary system in which the environment is the victim but never a party.

1. Forum Selection

The oldest process for the resolution of disputes is negotiation between the parties. Involvement of a neutral third-party adjudicator is relatively recent, dating from the middle 19th century and generally requires the consent of the litigating parties. One common procedure is an agreement

to arbitrate. Arbitration, in which the parties select an impartial arbitrator or panel, results in legally binding decisions, but the parties may specify the law the arbitrators must apply.

International judicial bodies are increasingly utilized, although recourse to litigation is still relatively rare for environmental matters. The UN Charter gives the International Court of Justice the power to decide cases that states submit to it, which could include environmental disputes. Art. 36(1) of the Statute of the Court confirms that the jurisdiction of the Court comprises, *inter alia*, all cases that the parties refer to it and all matters specially provided for in treaties and conventions in force. Several dozen multilateral environmental agreements contain provisions providing for the submission of disputes arising from their interpretation or application to the ICJ. In addition, Agenda 21, adopted at the Rio Conference in 1992, encourages states to have recourse to the ICJ to resolve environmental disputes. Agenda 21, Chapter 39.10.

The Court has indicated its readiness to accept environmental cases by establishing a seven-member chamber for environmental matters, whose first members were elected in July 1993. The environmental chamber has not been used to date, but the Court received six submissions concerning environmental protection after its creation. The most significant environmental judgment came in the *Gabčíkovo-Nagymaros Project Case*, wherein the Court recognized the fundamental importance of environmental protection in the modern world. It declared that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings. As a consequence, the Court found that states have the obligation to respect and protect the natural environment. In this regard, the Court recognized the temporal dimension inherent in environmental protection:

Throughout the ages, mankind has, for economic and other reasons, constantly interfered with nature. In the past, this was often done without consideration of the effects upon the environment. Owing to new scientific awareness and a growing awareness of the risks for mankind—for present and future generations—of pursuit of such interventions at an unconsidered and unabated pace, new norms and standards have been developed, set forth in a great number of instruments during the last two decades. Such new norms have to be taken into consideration, and such new standards given proper weight, not only when States contemplate new activities but also when continuing with activities in the past.

Gabčíkovo Nagymaros Project (Hung. v. Slovakia), 1997 ICJ 7, para. 140 (Sept. 25).

The Dispute Settlement Understanding (DSU), which is Annex 2 to the 1994 Agreement Establishing the World Trade Organization, is an integral part of the WTO Agreement and legally binding. It utilizes processes of

consultation, good offices/conciliation/mediation, and arbitration, together with a process of panels and appellate review. Various disputes between states involving trade restrictions for environmental purposes have been heard by WTO panels.

Finally, the Rome Statute of the International Criminal Court gives the Court jurisdiction over war crimes, defined as grave breaches of the 1949 Geneva Conventions on the Laws of Armed Conflict or “other serious violations of the laws and customs applicable in international armed conflict, within the established framework of international law.” Among the list of enumerated offenses is “intentionally launching an attack in the knowledge that such attack will cause incidental . . . widespread, long-term, and severe damage to the natural environment which would be clearly excessive in relation to the concrete and direct overall military advantage anticipated.” Art. 8(2)(b)(iv). The ICC is the only permanent international tribunal that foresees prosecution of individuals for environmental harm.

2. Choice of Law

The wealth of existing international obligations poses problems of coordination and potential conflict for dispute settlement bodies. Any study of environmental instruments will reveal some inconsistency in norms and consequent indeterminacy of obligations. To take one example, the threshold at which transboundary water pollution becomes a violation of international law is variously stated in legal instruments as “appreciable,” “substantial,” “measurable,” or “significant” harm, each of which has a different meaning and would impose a more or less stringent duty on the state. The lack of consistency may result from political compromise, problems of translation from one language to another, or may reflect an underlying disagreement over the goals and priorities of the agreement.

The Convention on Biological Diversity (CBD) exemplifies the problem of reconciling and coordinating divergent goals contained in the same treaty. CBD’s stated aims are threefold: (1) conservation of biological diversity, (2) the sustainable use of its components, and (3) equitable benefit sharing from utilization of genetic resources, including by appropriate access and transfer of relevant technologies. CBD, Art. 1. The goals may coincide, but also may diverge. The parties who drafted the Convention put them all at an equal level, leaving the problem of priorities or balancing for future resolution.

The proliferation of international environmental instruments has led to an inevitable overlap and occasional conflicts among legal obligations. The Vienna Convention on the Law of Treaties adopts rules for the application of different treaties “relating to the same subject-matter” (VCLT, Art. 30), but no choice of law principle for treaties generally. This is a topic that is the source of much debate. The CBD covers the entire natural world, but does it relate to the “same” subject matter as does the UN

Convention on the Law of the Sea (UNCLOS), which includes numerous provisions concerning marine living resources? The CBD addresses this issue, with Art. 22 providing that it is to be implemented consistent with the rights and obligations of states under the law of the sea, effectively subordinating CBD to UNCLOS as far as marine living resources are concerned. The CBD also is one of the few instruments that indicates a relative hierarchy between it and other treaties: according to Art. 22, that the CBD shall not affect the rights and obligations of any contracting party deriving from any existing international agreement *except where the exercise of those rights and obligations would cause a serious damage or threat to biological diversity*. Where such damage would occur or be threatened, the parties apparently intend the CBD to be given priority. Difficult issues may arise in the future if there is a dispute over performance of a bilateral treaty that would affect biodiversity, and one state is a party to the CBD but the other state is not.

Like the CBD, recent environmental agreements increasingly cross-reference other international instruments. Marine environmental treaties, for example, often cite to MARPOL or UNCLOS, incorporating their rules by reference. The result could be to extend the legal effect of these instruments to states that have not ratified them but which ratify the texts that cite to them, especially when the citation affirms the norms as customary international law. An example of this can be seen in the preamble to the Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, Sept. 22, 1992), which refers to “the relevant provisions of customary international law reflected in Part XII of the UN Law of the Sea Convention and, in particular, Article 197 on global and regional cooperation for the protection and preservation of the marine environment.”

The 1992 North American Free Trade Agreement, in Art. 104 and Annex 104.1, provides that in the event of any inconsistency between the Agreement and the obligations set out in named environmental agreements, the latter obligations prevail. These choice-of-law provisions are a new trend in international law and reflect the importance given to environmental protection. If the preemption of treaty obligations by environmental norms becomes widely accepted, this could be the beginning of a recognition that core environmental obligations constitute fundamental norms of international law.

The repeated cross-referencing of norms also can be seen as a movement toward consolidation of a global environmental code. An increasing number of concepts, principles, and norms appear repeatedly in national, regional, and global instruments, usually following an initial formulation in a non-binding declaration. Principles, such as public participation, EIA, notification of environmental emergencies, prevention, precaution, and polluter pays, are examples of principles that have been incorporated and detailed in numerous treaties. The meaning and application of these principles is the subject of the next chapter.

Chapter V

Common (Customary?) Legal Principles

Customary international law, general principles of law, and normative instruments have advanced a kind of common law of the environment. Norms and principles have emerged to become widely accepted and repeated consistently in treaties and national laws concerned with environmental protection. New norms and principles are in the process of formation, as international environmental law evolves to meet new challenges.

Principles are perhaps more widely used in international environmental law than in any other field of international law. Principles can indicate the essential characteristics of legal institutions, designate fundamental legal norms, or fill gaps in positive law. Principles may appear in constitutions and statutes, or they may be judicially constructed. A principle also may provide the general orientation and direction to which positive law must conform, a rationale for the law, without itself constituting a binding norm. Principles have been called “rules of indeterminate content,” having a degree of abstraction so great that it is not possible to deduce precise obligations from them with any degree of certainty. Given this range of meaning, it is unsurprising that even the concept of “principle” and the juridical value, if any, of a principle vary from one legal system to another.

All of the major non-binding normative instruments on the environment contain principles that are taken up, defined, and given concrete meaning in international treaties and jurisprudence. Some treaties also make use of principles. The Treaty of European Union, for example, in Title XVI sets out the principles meant to guide EU policy on the environment and shape its legislation. Art. 174(2) provides that EC environmental policy shall be based on “the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.”

It is precisely the complexity of many environmental issues that makes specific regulation so difficult at the international level and why principles play such an important role in setting forth the general approach of anticipation rather than reaction to environmental problems. The preventive model is necessary, because our understanding of the environment is no longer able to keep pace with our ability to modify it, often in irreversible ways. Prevention thus may lead to precaution. This chapter assesses the common substantive, procedural, and equitable principles of international environmental law.

A. SUBSTANTIVE PRINCIPLES

International law first faced issues of environmental protection in the context of bilateral disputes resulting from transfrontier pollution. The international community subsequently realized that environmental problems are not so limited, and that approaching environmental protection through rules designed to resolve bilateral problems would provide only limited solutions or might serve only to transfer the environmental harm elsewhere. From this understanding, various substantive principles arose that apply to state conduct generally.

1. Prevention of Harm

Traditional international law respects each state's exclusive jurisdiction over its territory. Yet, acts that are permitted to take place or originate on the territory of one state may cause damage or infringe upon the sovereignty of another state, giving rise to conflict between the rights of the two states. Case law precedents and the adaptation of general rules of international law have produced the foundational norm of international environmental law that prohibits transfrontier pollution. States first defined the pollution that must be prevented in OECD Council Recommendation C(74)219, of Nov. 14, 1974. The same definition has since appeared, with minor modifications, in all major international texts on the topic:

pollution means the introduction by man, directly or indirectly, of substances or energy into the environment resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems, and impair or interfere with amenities and other legitimate uses of the environment.

Originating in the *Trail Smelter* arbitration, the duty to prevent extra-territorial environmental harm was most famously stated in the 1972 Stockholm Declaration, Principle 21 quoted in Chapter II, Section A. The principle has been repeated in MEAs like the Convention on Biological Diversity (Art. 2) and the UN Climate Change Convention. The U.S. *Restatement of Foreign*

Affairs Law (Third), § 601, similarly refers to the obligation of states “to conform to generally accepted international rules and standards for the prevention, reduction, and control of injury to the environment of another state or of areas beyond the limits of national jurisdiction.” The International Court of Justice has called the duty to prevent extra-territorial environmental harm part of customary international law. See Chapter I, Section E.1.

The duty to avoid transfrontier pollution requires each state to exercise “due diligence,” which means to act reasonably and in good faith and to regulate public and private activities subject to its jurisdiction or control that are potentially harmful to any part of the environment. The principle does not impose an absolute duty to prevent all harm, but rather requires each state to prohibit those activities known to cause significant harm to the environment, such as the dumping of toxic waste into an international lake, and to mitigate harm from lawful activities that may harm the environment, by imposing limits, for example, on the discharges of pollutants into the atmosphere or shared watercourses.

The general duty of prevention clearly emerges from the international responsibility not to cause significant damage to the environment extra-territorially, but the preventive principle seeks to avoid harm irrespective of whether or not there are transboundary impacts. The rationale derives from the interdependence of all parts of the environment and the fact that it is frequently impossible to remedy environmental injury: the extinction of a species of fauna or flora, erosion, and the dumping of persistent pollutants into the sea create irreversible situations. Even when harm is remediable, the costs of rehabilitation are often prohibitive. Art. 192 of the UN Convention on the Law of the Sea first expressed the general requirement of prevention by affirming that “[s]tates have the general obligation to protect and preserve the marine environment.” Subsequently, Art. 20 of the 1997 UN Convention on the Non-Navigational Uses of International Watercourses (New York, May 21, 1997) affirmed the same duty for international freshwater. The 1992 Convention on Biological Diversity lists the measures that should be taken to ensure conservation and sustainable use of biological resources within states parties.

The requirement to prevent harm is complex owing to the number and diversity of the legal instruments in which it appears. It can perhaps better be considered an overarching aim that gives rise to a multitude of legal mechanisms, including prior assessment of environmental harm and procedures to license or authorize hazardous activities, including setting the conditions for operation and the consequences of violations. Emission limits and other product or process standards, the use of best available techniques (BAT), and similar techniques can all be seen as applications of the principle of prevention. Prevention also can involve the elaboration and adoption of overarching strategies and policies.

Prior assessment of activities, monitoring, notification, and exchange of information, are general obligations contained in nearly all environ-

mental agreements. Since the failure to exercise due diligence to prevent significant transboundary harm can lead to international responsibility, the presence or absence of properly done environmental impact assessments can serve as a standard for determining whether or not due diligence was exercised.

The duty of prevention also extends to combating the introduction of exogenous species into an ecosystem. Art. 22 of the UN Convention on the Law of the Non-Navigational Uses of International Watercourses (New York, May 21, 1997) requires watercourse states to “take all measures necessary to prevent the introduction of species, alien or new, into an international watercourse which may have effects detrimental to the ecosystem of the watercourse resulting in significant harm to other watercourse States.”

In fact, the objective of almost all international environmental instruments is to prevent environmental deterioration, whether the texts concern pollution of the sea, inland waters, the atmosphere, or the protection of living resources. Only a few international instruments rely on other approaches, such as the traditional principle of state responsibility for harm already caused or direct compensation of the victims by the originator of the pollution.

The positive side of prevention is protection and conservation. There is no treaty definition of the terms “protect,” “preserve,” or “conserve.” The first two terms are used together in Art. 192 of the Convention on the Law of the Sea, suggesting that they have different meanings. Protection can be seen as abstaining from harmful activities and taking affirmative measures to ensure that environmental deterioration does not occur. Increasingly, the concept of protection includes comprehensive ecological planning and management, with substantive regulations, procedures, and institutions on a national scale. Preservation could be considered as including long-time perspectives that take into account the rights and interests of future generations for whom natural resources should be safeguarded. The term “conserve” or “conservation” has a narrower scope, but falls under the heading of protection. It generally is used in the field of living resources and is based upon the status quo, mainly demanding maintenance of the conditions necessary for continued resource existence at present levels.

When applied to exploited species of flora and fauna, conservation often means establishing “optimal sustainable yields,” signifying exploitation of the resource without exceeding the limits that guarantee its renewal and thus its sustainability. In recent texts “conservation” has been supplemented or replaced by reference to “sustainable development,” assuring the on-going productivity of exploitable natural resources and conserving all species of fauna and flora. A related concept is the “favorable state of conservation,” based not on the idea of exploitation or of yield but on that of maintaining living resources at optimum levels.

Terms such as “essential ecological processes,” “genetic diversity,” and even “sustainable development” are abstract and relatively new, providing little guidance to states on the content of their obligations. The legal principles adopted by the World Commission on Environment and Development helpfully further elaborated on some terminology. They provide that states shall:

- (a) maintain ecosystems and related ecological processes essential for the functioning of the biosphere in all its diversity, in particular those important for food production, health and other aspects of human survival and sustainable development;
- (b) maintain maximum biological diversity by ensuring the survival and promoting the conservation in their natural habitat of all species of fauna and flora, in particular those which are rare, endemic or endangered;
- (c) observe, in the exploitation of living natural resources and ecosystems, the principle of optimum sustainable yield.

Additional detail is found in various international conventions aimed at protecting living species threatened with extinction and those concerned with the natural heritage in general. One of the earliest instruments is the Convention on Wetlands of International Importance (Ramsar, Feb. 2, 1971). Art. 2(6) speaks of the responsibility of each contracting party for the conservation, management, and wise use of migratory stocks of waterfowl, notably in designating wetlands in its territory that should receive a special protection. More extensive duties exist in the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (Nov. 23, 1972). Art. 4 of this Treaty proclaims the obligation of states to ensure the identification, protection, conservation, presentation, and transmission to future generations of the cultural and natural heritage that is situated on its territory. Such provisions appear even more frequently on the regional level.

Finally, it is unclear whether or not a legal right or obligation to assist a state in an environmental emergency falls within the duty to prevent environmental harm. Assistance usually implies operations on the territory of a foreign state (or its flag ship in the case of a maritime emergency), and traditionally necessitates specific arrangements between the states requesting and supplying assistance. States may hesitate to permit assistance, because while it is sometimes necessary, it is also inherently intrusive of state sovereignty. As a general rule, international law requires state consent before external authorities can enter territory. UNCLOS Art. 199 summarizes the situation well, foreseeing that in case of imminent risk of damage or of actual damage from pollution to the marine environment, advance agreement is necessary:

States in the areas affected, in accordance with their capabilities, and the competent international organizations shall cooperate, to the extent possible, in eliminating the effects of pollution and preventing or minimizing the damage. To this end, States shall jointly develop and promote contingency plans for responding to pollution incidents in the marine environment.

Cooperative arrangements should detail preventive action and action to be taken in case of an accident. Prior action consists of exchanges of information regarding the competent organs that should be notified, development and exchange of plans or national programs applicable in case of an emergency, and information about the applicable legal rules. States may organize the surveillance of specified zones. Plans for action during emergencies should focus on the organization of assistance, the scope and division of authority, arrangements for financing, and customs formalities concerning aid personnel and supplies.

2. Precaution

The proclamation of the precautionary principle, which the U.S. government prefers to call the precautionary approach, can be considered one of the most important provisions in the Rio Declaration. Principle 15 provides:

In order to protect the environment, the precautionary principle shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Formulations of the precautionary principle are relatively recent, but since 1992 the precautionary principle has appeared in almost all international instruments related to environmental protection.

Concrete application of the precautionary principle is often found in treaties for the management of living resources, especially those concerning fishing. In addition, the Biosafety Protocol (Cartagena, Jan. 29, 2000) to the Convention on Biological Diversity is based upon the precautionary principle. Art. 1, on the objectives of the Protocol, refers explicitly to Rio Principle 15, while Arts. 10 and 11 contain the key provisions on precaution. Art. 10(6) says that “lack of scientific certainty due to insufficient relevant information and knowledge regarding the extent of the potential adverse effects of an LMO shall not prevent the party from taking a decision on the LMO in order to avoid or minimize such potential adverse effects.” Art. 11 uses similar language in allowing a country to reject an import even in the absence of scientific certainty about its potential to cause harm. These provisions are broader than Rio

Principle 15, because they lack reference to “serious or irreversible damage” or to cost-effectiveness.

In general, the precautionary principle can be considered as the most developed form of prevention that remains the general basis for environmental law. Precaution means preparing for potential, uncertain, or even hypothetical threats, when there is no irrefutable proof that damage will occur. It is prevention based on probabilities or contingencies, but it cannot eliminate all *claimed* risks, because these are claims that lack any scientific basis, such as those based on astrological predictions or psychic visions. Precaution particularly applies when the consequences of non-action could be serious or irreversible. Policymakers must consider the circumstances of a given situation and decide whether scientific opinion is based upon credible evidence and reliable scientific methodology. Such a development expands the important role of scientists in the protection of the environment: decisionmakers must adopt measures based upon a general knowledge of the environment and the problems its protection raises. Like in all environmental matters, the public must support the decision. The role of scientists thus includes a general environmental education of the public as well as of those who take the formal decision.

3. The “Polluter Pays” Principle

The polluter pays principle seeks to impose the costs of environmental harm on the party responsible for the pollution. This principle was set out by the OECD as an economic principle and as the most efficient way of allocating costs of pollution prevention and control measures introduced by the public authorities in member countries. It is intended to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment.

The Rio Declaration Principle 16 contains one formulation of the polluter pays principle:

National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with regard to the public interest and without distorting international trade and investment.

The polluter pays principle is incorporated in the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, Sept. 22, 1992). According to Art. 2(2)(b) “[t]he contracting parties shall apply: . . . the polluter pays principle, by virtue of which the costs of pollution prevention, control and reduction measures are to be borne by the polluter.” This can be interpreted in different ways depending upon the extent of prevention and control and whether compensation for dam-

age is included in the definition of reduction. Further, the very concept of the “polluter” can vary, from the producer of merchandise to the consumer who uses it and who pays the higher price resulting from anti-pollution production measures. International practice thus far, which is mainly that of the EU, seems to aim at eliminating public subsidies for pollution abatement by companies.

In fact, pollution control costs can be borne either by the community, by those who pollute, or by consumers. Using the example of an industry that discharges pollutants into a river, there are at least five possible allocations of the economic consequences:

1. The river can remain polluted and rendered unsuitable for certain downstream activities, causing the downstream community to suffer an economic loss;
2. The downstream community can build an adequate water treatment plant at its own cost;
3. The polluter may receive public subsidies for controlling the pollution. In all these hypotheses, the affected community bears the cost of the pollution and of the measures designed to eliminate it or to mitigate its effects;
4. The polluter bears the costs of pollution control in application of the polluter pays principle;
5. The enterprise incorporates the costs of pollution abatement in the price of the products and passes them on to the consumer.

Disincentives, such as penalties and civil liability, can also be seen as applications of the polluter pays principle. They aim to induce actors to take greater care in their behavior to avoid the increased costs represented by the penalties. Little empirical work has been done, but there is some evidence for the preventive effect of a liability regime. As a matter of economic analysis, in a perfect market those responsible for harm would be expected to invest in prevention when the cost of prevention is likely to avoid damage that would be more costly to restore than to prevent. The market is not perfect, however, in part because of regulatory intervention. For example, prevention may require new equipment that tax regulations demand be capitalized and depreciated over time, while the costs of restoration can be deducted immediately as expenses, making the latter preferable to the former as an economic matter. Permit requirements may make changes to installations more difficult and costly, even if the result is greater prevention. The uncertainty of harm, its scale or likelihood may also contribute to a decision that the costs of prevention are greater than the potential costs of liability.

The polluter pays principle can be applied most easily in a geographic region subject to uniform environmental law, such as within a state or in

the European Union. In fact, the polluter pays principle has been well defined in EU law. Polluters should pay for the cost of pollution control measures, such as the construction and operation of anti-pollution installations, investment in anti-pollution equipment and new processes, so that a necessary environmental quality objective is achieved. EC Directive 84/631 (Dec. 6, 1984) on the control within the European Community of the transfrontier shipment of hazardous waste illustrates application of the principle. It instructs the member states to impose the costs of waste control on the holder of the waste and/or on prior holders or the waste generator. See, further, Chapter VIII, Section A.1

4. Sustainable Development

Since the end of the 1980s, the principle of sustainable development dominates international activities in the field of environmental protection. It was defined in the 1987 Report of the World Commission on Environment and Development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The Report identified the critical objectives of sustainable development:

- reviving growth but changing its quality;
- meeting essential needs for jobs, food, energy, water, and sanitation;
- ensuring a sustainable level of population;
- conserving and enhancing the resource base;
- reorienting technology and managing risk; and
- merging environment and economics in decisionmaking.

Principle 4 of the Rio Declaration states that “in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.” Approaches that take into account long-term strategies and that include the use of environmental and social impact assessment, risk analysis, cost-benefit analysis, and natural resources accounting are necessary. The integration of environmental, social, and economic policies also requires transparency and broad public participation in governmental decisionmaking.

As its title shows, the Johannesburg World Summit on Sustainable Development focused on this concept with particular emphasis on eradicating poverty. During the same year, the first attempt to define sustainable development in a binding text appeared in Art. 3(1)(a) of the Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua, Feb. 18, 2002):

For the purpose of this Convention sustainable development means the process of progressive change in the quality of life of human beings, which places it as the center and primordial subject of development, by means of economic growth with social equity and the transformation of methods of production and consumption patterns, and which is sustained in the ecological balance and vital support of the region. This process implies respect for regional, national and local ethnic and cultural diversity, and full participation of people in peaceful coexistence and in harmony with nature, without prejudice to and ensuring the quality of life of future generations.

In the same treaty, the concept of maintaining “environmental services” is seen as essential to sustainable development. According to the convention, it means the services provided by the functions of nature itself, such as the protection of soil by trees, the natural filtration and purification of water, and the protection of habitat for biodiversity. Art. 3(1)(c).

B. PRINCIPLES OF PROCESS

Several values are reflected in the emphasis on procedural principles in international environmental law. Access to environmental information can assist enterprises in planning for and utilizing the best available techniques and technology. Early and complete data assists decisionmakers to make informed choices. In addition, the process by which rules emerge, how proposed rules become norms and norms become law, is highly important to the legitimacy of the law, and legitimacy in turn affects compliance. When those governed have and perceive that they have a voice in governance, they may see the decisions taken as ones in which they are stakeholders and which they will uphold.

1. Duty to Know

Proper action to prevent harm to the environment cannot be taken without knowledge of the environmental conditions, nor can the impact of proposed activities be evaluated without basic information on the relevant area. Thus, the implementation, as well as the formulation, of environmental laws and policies require the collection of reliable information and the continuous assessment of the environmental milieu. The techniques adopted in international and national environmental laws to ensure this are surveillance, reporting, and monitoring.

International environmental instruments generally require the acquisition of data through inventories or surveillance, mainly a scientific activity, on which further action, such as monitoring, may be based. See, e.g., UN Straddling Stocks Convention (Aug. 4, 1995), Convention on Biological Diversity (June 5, 1992), the UNFCCC (May 9, 1992), MARPOL (Feb. 17,

1978), UNCLOS (Dec. 10, 1982), and the Rhine Chemicals Convention (Dec. 3, 1976). The parties to the CBD, for example, are obliged to identify important components of biological diversity and monitor them, through sampling or other techniques. It can be done by individual enterprises, by associations, or by local or national authorities. Once the information is obtained, it must be assembled, organized, and analyzed by an appropriate agency or institution to which the information is sent. It is common to find environmental laws requiring reporting by enterprises or state institutions.

Monitoring is the continuous assessment of information, comparing it to mandated parameters. The 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, Sept. 22, 1992), Annex IV, Art. 1 defines monitoring as the “repeated measurement” of three separate, but related, items: (1) the quality of the environment and each of its compartments; (2) activities or natural and anthropogenic inputs which may affect the quality of the environment; (3) the effects of such activities.

Monitoring is a necessary foundation for giving effect to all environmental obligations. Generally, a monitoring organ can propose legal changes based on reports and information that make it possible to assess the effectiveness of existing measures. Monitoring provides constant feedback for decisionmaking, from long-term protection to rapid guidance in emergencies. To ensure progress, the effectiveness of surveillance and monitoring must itself be assessed.

Principle 19 of the World Charter for Nature adopted in 1982 by the UN General Assembly, recommends that states, international organizations, and private actors monitor all sectors of the environment for all forms of environmental deterioration “to enable early detection of degradation or threat, ensure timely intervention and facilitate the evaluation of conservation policies and methods.” Some international agreements contain explicit surveillance and monitoring obligations. The UN Convention on the Law of the Sea in Art. 204 mandates that states shall:

1. . . . consistent with the rights of other states, endeavor, as far as practicable, directly or through the competent international organizations, to observe, measure, evaluate and analyze, by recognized scientific methods, the risks or effects of pollution of the marine environment.
2. In particular, states shall keep under surveillance the effects of any activities which they permit or in which they engage in order to determine whether these activities are likely to pollute the marine environment.

Notably, this obligation extends to all areas of the marine environment. Permanent monitoring and international cooperation are also required

by other international conventions, including the regional seas agreements and those governing the dumping of wastes at sea, international watercourses, ozone-depleting substances, air pollution, climate change, biological diversity, fisheries, and desertification. International treaties relating to conservation of wildlife frequently require states to undertake inventories concerning biological diversity, the status of protected species, or their activities aimed at conserving or managing living resources.

The 1979 Convention on Long-Range Transboundary Air Pollution contains provisions for creating a cooperative program for the monitoring and evaluation of the long-range transmission of air pollutants in Europe (EMEP). EMEP monitors sulphur dioxide and related substances, develops and uses comparable or standardized monitoring procedures, and establishes monitoring stations as part of the international program (Art. 9). A 1984 Protocol provided for long-term financing of EMEP.

Monitoring or inspection of record books is required by treaties relating to the carriage of oil, carriage by sea of hazardous substances, imported species and goods, worker health, air quality of the working environment, the composition of waste to be dumped, discharge of harmful substances, and fisheries conservation levels. In some circumstances, UNCLOS allows the physical inspection of foreign vessels, as do many Memoranda of Understanding on Port State Control. Monitoring systems have been established by several international organizations who use it to identify trends and patterns.

The duty to know imposes a further procedural obligation related to the principle of prevention—prior assessment of potentially harmful activities, discussed in detail in the next chapter. This duty is expressed in the Rio texts in the Declaration, Principle 17; Chapter 22 of Agenda 21; Art. 8(h) of the Statement on Forests, and Art. 14(1)(a) and (b) of the Biodiversity Convention. Art. 206, Convention on the Law of the Sea (Dec. 10, 1982) is also clear: “When states have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments.”

2. Duty to Inform and Consult

A state that plans to undertake or authorize activities capable of having significant impact on the environment of another state must inform the latter and should transmit to it the pertinent details of the project, provided no national legislation or applicable international treaty prohibits such transmission. The 1992 Rio Declaration formulates the obligation as follows: “States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant

adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.” Principle 19.

As the Rio Declaration indicates, the duty to consult often accompanies the duty to inform. This is evidenced in Art. 5 of the 1979 Geneva Convention on Long-Range Transboundary Pollution, which calls for consultations between any state affected by long-range transboundary air pollution or exposed to a significant risk of such pollution and the state on whose territory and within whose jurisdiction a substantial part of such pollution is or may be created because of existing or proposed activities. The 1974 OECD text containing Principles Concerning Transfrontier Pollution is also indicative. Art. 8 specifies that countries should refrain from carrying out projects or activities that might create a significant risk of transfrontier pollution until they have informed and provided a reasonable amount of time for diligent consultation with countries that are or may be affected. In addition, countries should enter into consultations on an existing or foreseeable transfrontier pollution problem at the request of a country that is or may be directly affected and should diligently pursue such consultations on the particular problem over a reasonable period of time. Such consultations, “held in the best spirit of cooperation and good neighborliness,” should not entail unreasonable delay or impediments to activities or projects.

The obligation to enter into consultation signifies that the state that is the potential polluter must be willing to discuss the information that it has forwarded to the potentially affected state, which in turn may make observations concerning the project. However, the observations need not be fully accepted by the state that proposes to act; otherwise the potentially affected state would have an effective veto over planned projects.

Parallel to the interstate duty to inform and consult, an emerging international obligation suggests duties towards the residents of the potentially affected state. Norms requiring equality of information and access to administrative or judicial procedures are contained mainly in non-binding international texts and in some judicial opinions, although some bilateral treaty arrangements have been concluded. Information is required on projects, activities, and new developments that could engender a risk of damage to the environment of non-residents. Non-residents may also seek access to information that the competent national authorities make available to their own interested local persons.

Non-residents informed of potential or actual harm that could affect them should be allowed to participate in decision-making procedures, have a right to appeal when relevant rules have been improperly applied by decisionmakers, and be provided access to justice and remedies in case of environmental damage. Non-resident participation in decision-making includes the right to make oral or written observations or to express an opinion in any other manner under the same conditions as residents. Where existing laws and procedures in the state of origin have

not been respected, non-residents should have at their disposition the same remedies as residents.

The right of non-residents to demand compensation for damage they have suffered due to transfrontier pollution is undoubtedly the most accepted norm related to equality of access. The same access to justice and remedies should be available to them as to residents of the country where the harm originates. This includes application of the same substantive law and the same measures of compensation as are available to persons injured within the polluting state's territory. National laws sometimes implement this norm on a basis of reciprocity. See the U.S. Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601. CERCLA provides that a foreign claimant may assert a claim to the same extent as a U.S. claimant if there is a treaty or executive agreement with the foreign country involved, or if the Secretary of State certifies that such country provides a comparable remedy for U.S. claimants. 42 U.S.C. § 9611(1). In addition, the U.S. and Canadian Bar Associations implemented a 1977 OECD recommendation for implementation of equal access and non-discrimination. In the absence of a treaty, a private Joint Working Group from the two countries prepared a draft Uniform Transfrontier Pollution Reciprocal Access Act, subsequently incorporated into the state and provincial laws of Colorado (Colo. Rev. Stat. § 13-1.5.101, 1984), Montana (Mont. Code Ann. § 75-16-101, 1987), New Jersey (N.J. Stat. Ann. 2A:58A-1, 1984), Wisconsin (Wis. Stat. Ann. § 144.995, 1987), Manitoba (Man. Stat. 1985, ch.11), and Ontario (Ont. Stat. 35 Eliz. II, c. 10, 1986).

Apart from the duty to inform and consult on planned activities, treaties and state practice indicate states should immediately inform other states likely to be affected by any sudden situation or event that could cause harm to their environment and provide those states with all pertinent information. The duty to notify of environmental crises is spelled out in numerous international treaties. UNCLOS Art. 198 sums up the provisions contained in various conventions relating to marine pollution, including regional seas agreements: "When a State becomes aware of cases in which the marine environment is in imminent danger of being damaged or has been damaged by pollution, it shall immediately notify other States it deems likely to be affected by such damage, as well as the competent international organization."

3. Public Participation

Public participation is based on the right of those who may be affected to have a say in the determination of their environmental future. The Rio Declaration on Environment and Development established a robust principle for including the public in environmental decisionmaking. Principle 10 declared that access to information, public participation, and access to

effective judicial and administrative proceedings, including redress and remedy, should be guaranteed, because “environmental issues are best handled with the participation of all concerned citizens, at the relevant level.”

Participation may take place through elections, grass roots action, lobbying, public speaking, hearings, and other forms of governance, whereby various interests and communities participate in shaping the laws and decisions that affect them. The major role played by the public in environmental protection is usually through participation in environmental impact or other permitting procedures.

Several dozen international treaties adopted since the Stockholm Conference call upon states to take specific measures to ensure that the public is adequately informed about the risks posed to them by specific activities. The Convention on the Transboundary Effects of Industrial Accidents (Helsinki, 1992), for example, recognizes “the importance and urgency of preventing serious adverse effects of industrial accidents on human beings and the environment,” and requires states parties to provide adequate information to the public and, whenever possible and appropriate, give persons the opportunity to participate in relevant procedures and afford them access to justice. Art. 9. Annex VIII to the Convention details the information to be provided. Agreements requiring environmental impact assessments generally demand assessment of any effect caused by a proposed activity on the environment, specifically including human health and safety. See also Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, Feb. 25, 1991), Art. 1(viii).

The protections afforded have increased in scope and number since the adoption of Principle 10 of the Rio Declaration on Environment and Development. The Cartagena Protocol on Biosafety (Montreal, Jan. 29, 2000) to the Convention on Biological Diversity, is an example. Its Art. 23 requires the states parties to facilitate awareness, education, and participation concerning the safe transfer, handling, and use of living modified organisms in relation to the conservation and sustainable use of biological diversity, taking into account risks to human health. Access to information on imported LMOs should be ensured, and the public consulted in the decision-making process regarding such organisms, with the results of such decisions made available to the public. Further, each party must inform its public about the means of public access to the Biosafety Clearing House created by the Convention.

The most comprehensive international agreement on the role of the public is the regional Convention on Access to Information, Public Participation and Access to Justice in Environmental Matters (Aarhus, June 25, 1998). The treaty builds on prior texts, especially Principle 1 of the Stockholm Declaration, which it incorporates and strengthens. The preamble forthrightly proclaims that “every person has the right to live in an environment adequate to his or her health and well-being, and the duty, both individually and in association with others, to protect and improve

the environment for the benefit of present and future generations.” It adds that to be able to assert the right and observe the duty, citizens must have access to information, be entitled to participate in decisionmaking, and have access to justice in environmental matters. These provisions are repeated in Art. 1 where states parties agree to guarantee the rights of access to information, public participation, and access to justice. Art. 19 opens the door to accession by states outside the UNECE region, provided that they are members of the United Nations, and that the accession is approved by the Meeting of the Parties of the Convention.

The Aarhus Convention is also important for procedural rights, because the states parties have established a compliance procedure that accepts individual complaints, and is the first environmental agreement to do so. The Compliance Committee has received and issued decisions on several complaints, finding violations and making recommendations to the states parties involved. See ECE/MP.PP/C.1/2005/2/Add.1, Mar. 11, 2005.

Finally, Directive 2003/4/EC (Jan. 28, 2003) replaces a former EC instrument on the right of access to environmental information held by public authorities. It aims to ensure that such information is made available and disseminated to the public. In particular, states must promote access to computer telecommunication and other electronic technology. Public authorities are required to make available environmental information to an applicant on his or her request and to ensure individuals have access to procedures in which state acts or omissions can be reconsidered or reviewed administratively by an independent and impartial body established by law.

C. EQUITABLE PRINCIPLES

In most national legal systems, equity has played a major part in determining the distribution of rights and responsibilities in conditions of scarcity and inequality. The general value of equity is largely accepted in this context, but debate exists on the appropriate principles to determine equitable allocation, e.g., whether decisions should be based on need, capacity, prior entitlement, “just deserts,” the greatest good for the greatest number, or strict equality of treatment. In addition, a single factor, such as need, may be asserted by more than one actor or group of actors. Equity also may provide a basis for decision in the absence of law or when it is necessary to fill in gaps in existing norms, such as when new issues emerge that give rise to disputes. International tribunals have applied equity in this way, but usually on the basis that the equitable principle being invoked is a general principle of law. Thus, international courts have applied notions such as equitable estoppel. See *Diversion of the Waters of the Meuse*, P.C.I.J. (ser. A/B) No. 70, at 25, where the Permanent Court of International Justice held that it was inequitable for the applicant state to complain of a harmful act that the applicant itself had committed in the past.

In international environmental law, some developing countries have argued for exemptions from legal norms or for preferential treatment on the basis that international legal rules impose upon them a disproportionate environmental burden due to the export of pollution from wealthier countries, while they are unable to share in the benefits derived from activities producing the pollution. Trade preferences that accord differential and more favorable treatment to developing countries, as an exception to Art. I of GATT, reflect such equitable adjustments to the law. Developing countries have successfully pressed the issue of equitable allocation of resources and burden-sharing for several reasons. First, they hold the major part of the earth's biological resources and need or want to use them for economic development, while developed states have an interest in the conservation and sustainable utilization of these resources, many of which are the source of desired products, as well as a foundation of ecological processes (for example, tropical forests as carbon sinks). Second, developing countries have been able to focus on fairness in pointing out the predominant responsibility of wealthier states for pollution. Third, developing states can legitimately plead their inability to participate in or comply with environmental protection agreements due to poverty and weak institutions.

Equity has been utilized most often in environmental agreements to fairly allocate and regulate scarce resources and to ensure that the benefits of environmental resources, the costs associated with protecting them, and any degradation that occurs (that is, all the benefits and burdens) are fairly shared by all members of society. In this respect, equity is an application of the principles of distributive justice, which seek to reconcile competing social and economic policies in order to obtain the fair sharing of resources. It does this by incorporating equitable principles in legal instruments to mandate just procedures and results.

Concern about the equitable distribution of the burdens of environmental protection has led to the creation of a series of financial mechanisms, exemptions, provisions for the transfer of technology, and flexibility in the time required for compliance with international obligations. Capacity-building through the provision of financial resources and the transfer of technology is widely included in global multilateral environmental agreements and often becomes a condition for compliance by developing countries. Explicitly stating that economic and social development and poverty eradication are the first and overriding priorities of developing country parties, the Convention on Biological Diversity (CBD) and the UN Framework Convention on Climate Change (UNFCCC) make the provision of financial resources and the transfer of technology from developed country parties a condition for the implementation of treaty obligations by developing country parties. Other conventions, such as the Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, express a

concern for the special needs and circumstances of developing countries, particularly the least developed, in combating environmental degradation.

1. Intergenerational Equity

Intergenerational equity as a principle of international justice is based on the recognition of two key facts: (1) human life emerged from, and is dependent upon, the earth's natural resource base, including its ecological processes, and is thus inseparable from environmental conditions; and (2) human beings have a unique capacity to alter the environment upon which life depends. From these facts emerges the notion that humans who are alive today have a special obligation as custodians or trustees of the planet to maintain its integrity to ensure the survival of the human species. Those living have received a heritage from their forbearers in which they have beneficial rights of use that are limited by the interests and needs of future generations. This limitation requires each generation to maintain the corpus of the trust and pass it on in no worse condition than it was received. Another way to consider the issue is to view current environmental goods, wealth, and technology as owing to the progress of prior generations. This debt cannot be discharged backward so it is projected forward and discharged in the present on behalf of the future.

The equitable concept of trust places obligations on the trustees, such as conserving and maintaining the trust resources. Since the trustees are also the present generation of beneficiaries, they are constrained in their use of resources. Meeting the obligation calls for minimizing or avoiding long-term and irreversible damage to the environment. Three implications emerge from the principle of intergenerational equity: first, that each generation is required to conserve the diversity of the natural and cultural resource base so that it does not unduly restrict the options available to future generations to satisfy their own values and needs. Second, the quality of ecological processes passed on should be comparable to that enjoyed by the present generation. Third, the past and present cultural and natural heritage should be conserved so that future generations will have access to it. These rights and obligations derive from a notion of human society that extends beyond the totality of the current planetary population, giving it a temporal dimension. While it may be objected that there are no rights-holders present to correspond to the obligations imposed, the Philippine Supreme Court has found that present generations have standing to represent future generations in large part because "every generation has a responsibility to the next to preserve that rhythm and harmony for the full enjoyment of a balanced and healthful ecology." *Minors Oposa v. Sec'y of the Dep't of Env't and Natural Res.*, reprinted in 33 ILM 168 (1994).

2. Common but Differentiated Responsibilities

All of the texts adopted at Rio include some formulation of the principle of common but differentiated responsibilities. Principles 6 and 7 of the Rio Declaration afford priority to the needs of the least developed and most environmentally vulnerable states, expressing the general principle of common but differentiated responsibilities. The principle was controversial, and the United States issued an interpretive statement indicating its view that the principle does not “imply a recognition . . . of any international obligations.” UN Conference on Environment and Development, UN Doc. A/CONF.151/26 (Vol. IV) (1992), at 20.

The U.S. view may not be entirely correct. The principle of common but differentiated responsibilities could encompass, and in some formulations discussed below has encompassed, the notion of the historic responsibility of the industrialized North for most environmental degradation used to achieve its wealth. In this sense, the principle of common but differentiated responsibilities appears as a legal concept involving redistribution of wealth based on notions of restitution or unjust enrichment. Principle 7 of the Rio Declaration, however, speaks not of historical responsibility but rather of the responsibility of developed countries for the *present and future* pursuit of sustainable development in view of the pressures their societies are placing on the global environment and on the resources they command.

The principle of common but differentiated responsibilities is now widely incorporated in MEAs. It calls broadly for developed countries to take the lead in solving existing global environmental problems. Thus, even though the responsibility for protecting the environment is to be shared among all nations, countries should contribute differently to international environmental initiatives depending on their capabilities and responsibilities.

The broader version of the principle referred to above would oblige the developed world to pay for past harms, as a form of corrective justice, as well as present and future harms. For both climate change and depletion of stratospheric ozone, the global community finds itself at the tipping point because of the conduct of the developed world. It is precisely because of this conduct that the marginal environmental costs of developing-nation industrialization today are high. Developed nations thus should pay for any reductions or modifications the developing world has to make in the process of industrialization, because developed-world industrialization has unfairly circumscribed the ability of the developing world to pass off the negative externalities of development on the environment. The true social and environmental costs of developed-nation industrialization were never accounted for in the past, so the unfairly obtained windfall should now be redistributed.

Developing nations thus argued that they are entitled to the resources and technology from developed nations, and that developed nations should have to internalize the environmental costs of on-going and future developing-nation industrialization. Some treaty provisions reflect this view. Art. 5(5) of the amended Montreal Protocol on Substances that Deplete the Ozone Layer, for example, provides that developing countries' capacity to fulfill the obligations and implement the control measures specified in the Montreal Protocol will depend upon the effective implementation by developed nations of financial cooperation and transfer of technology as set out in the Protocol. Similar statements are contained in Art. 4(7) of the UN Framework Convention on Climate Change and Art. 20(4) of the Convention on Biological Diversity.

An even broader justification calls for adjustments on the basis of restitution. It suggests that developed nations are not "entitled" to preserve the wealth they have accrued through industrial development, because these "entitlements" were obtained in a manner that does not justify their retention. If "entitlements" are perceived as transcending the area of environmental harms and extending into the externalities of the North's industrial development generally, including colonialism, mercantilism, and labor exploitation, then this could become a considerably more ambitious and controversial program.

3. Equitable Utilization of Shared Resources

Equitable utilization is a widely accepted principle applied in apportioning shared resources, such as watercourses and fish and other exploited species. It finds expression in Art. 2 of the 1997 UN Convention on the Law of Non-Navigational Uses of International Watercourses, which calls on the parties to take all appropriate measures to ensure that international watercourses are used in a reasonable and equitable way.

The status of equitable utilization as a fundamental norm in the field of shared natural resources was affirmed by the ICJ in the *Case Concerning the Gabčíkovo-Nagymaros Project (Hung./Slov.)*, Judgment of Sept. 25, 1997, 1997 ICJ 7. In the earlier *Fisheries Jurisdiction Cases (U.K. v. Iceland; FRG v. Iceland)*, the ICJ stressed the obligation of reasonable use and good faith negotiations aimed at an equitable result, taking into account the needs of conservation and the interests of all exploiters of the fishing resource. *Fisheries Jurisdiction Cases (U.K. v. Iceland; FRG v. Iceland)*, Judgments of July 25, 1974, 1974 ICJ 3; and 1974 ICJ 175. Thus, the notion of equitable utilization is one that attempts to make a "reasonable" allocation or reach a fair result in distribution of a scarce resource, based on what are deemed to be relevant factors, such as need, prior use or entitlement, and other interests. On a substantive level, each party is held to have an equal right to use the resource, but since one party's use can impact the beneficial uses of others, and not all uses can be satisfied, some limitations are nec-

essary. The Watercourses Convention states that equitable and reasonable uses are to be “consistent with adequate protection of the watercourse.” Art. 5. The phrase suggests that uses that would substantially harm the watercourse could be inherently inequitable and indicates how positive rules may restrict the scope and application of equitable principles.

Notions of entitlement stemming from prior uses, strict equality, proportional use based on population, and priority accorded to certain uses all have been asserted at one time or another as a basis for determining what is an equitable allocation. In some instances, the parties agree in advance on certain divisions or priorities. The 1909 Boundary Waters Treaty between the United States and Canada relies upon equality of use for the generation of power (each country being entitled to use half of the waters along the boundary) and equitable sharing of water for irrigation. In contrast, the 1959 Nile Agreement between the Sudan and Egypt for Full Utilization of Nile Waters confirmed the “established rights” of each party, without identifying them, while additional amounts were allocated on other equitable bases. While the Nile agreement seems to view established rights as guaranteed by law, most other instruments take the better view and include prior entitlements as one factor in determining equitable allocation.

The idea of equitable utilization in the past had as a corollary that no use had inherent priority over any other. Today, there appears to be a move towards recognizing that some resource uses do have priority over others. In the use of freshwaters, for example, emphasis is being placed on the satisfaction of basic human needs—that is, the provision of safe drinking water and sanitation. The Watercourses Convention provides that in the event of a conflict between the uses of an international watercourse, special regard is to be given to the requirements of vital human needs (Art. 10), while the UN Committee on Economic, Social and Cultural Rights, in its General Comment 12 on the Right to Water, insists that priority be given to safe drinking water and sanitation, with a guaranteed minimum amount to be provided to every person. Thus, substantive human rights considerations help determine appropriate allocation.

D. CONCLUSIONS

The common law of the environment is rapidly developing to include a general obligation to protect and conserve the global environment. Recent environmental agreements demonstrate the widespread acceptance of this notion and the principles discussed above. The Framework Convention on the Protection and Sustainable Development of the Carpathians (Kiev, May 22, 2003), is a recent example. The objective of the Treaty is articulated as “the protection and sustainable development of the Carpathians with a view to *inter alia* improving quality of life, strengthening local economies and communities, and conservation of natural values and cul-

tural heritage.” In order to achieve the stated objectives, Art. 2(2) provides that the parties are to utilize the principles of precaution and prevention; the polluter pays principle; public participation and stakeholder involvement; transboundary cooperation; integrated planning and management of land and water resources; a programmatic approach; and the ecosystem approach. These principles now expressed in positive law, such as the Carpathian agreement and other treaties, form the basic international framework for the development of detailed environmental regulations, internationally and within states. The widely accepted content of such regulations is the subject of the next chapter.

Chapter VI

Common Legal Requirements and Implementing Measures

International environmental instruments often suggest or mandate the use of specified techniques and procedures to achieve the aims of the agreement. While most instruments call for the adoption of legislation or regulation, some also detail the specific content of the measures to be taken. Art. 210 of UNCLOS (Dec. 10, 1982), for example, requires states parties to adopt laws and regulations to prevent, reduce, and control pollution of the marine environment by dumping. The third paragraph of the article specifies that states must “ensure that dumping is not carried out without the permission of the competent authorities” of the state. Other provisions permit or recommend particular techniques. UNCLOS Art. 62 allows that the laws and regulations of a state party concerning fishing in the EEZ “may relate” to licensing of fishermen and fishing vessels, payment of fees, setting fishing quotas and seasons, and similar measures.

The variety, complexity, and acceptance of these legal mechanisms have increased in recent years through the mutual influence of national and international environmental law. International environmental agreements today usually require states parties to adopt environmental impact and/or risk assessment procedures, licensing, and monitoring. Environmental auditing, product labeling, use of best available techniques and practices, and prior informed consent also commonly appear in global and regional instruments. States often enact and implement several techniques and procedures simultaneously in response to treaty mandates, as well as to particular threats to the environment, national and local conditions, traditions and cultural norms, and the economic situation specific to each country.

This chapter will survey the legal techniques and procedures that commonly appear in international environmental instruments. Environmental agreements and national laws often regulate a single environmental milieu, e.g., water, air, soil, biological diversity due to the particular environmen-

tal problems facing a given area, political or economic priorities, or the ease of achieving consensus on a specific environmental issue. A more comprehensive approach seeks integrated pollution prevention and control. The 1994 UN Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa requires states parties to adopt such an integrated approach, addressing the physical, biological and socio-economic aspects of the processes of desertification and drought. Art. 4(2) (a). Other international agreements mandate broad national Action Plans, with targets and timetables. See, e.g., Montreal Protocol (Sept. 16, 1987); Climate Change Convention (May 9, 1992); Biological Diversity Convention (June 5, 1992). See also Agenda 21 and Principle 3 of the Forest Principles (1992).

Texts calling for integrated pollution prevention and control exist also on the regional level, in the European Union and the OECD. The focus of “integrated pollution prevention and control” is on eliminating or at least reducing the input of each polluting substance, noting its origin and geographic target. Integrated pollution prevention and control involves a “cradle to grave” approach that considers the whole life cycle of substances and products, anticipates the effects of substances and activities on all environmental media, minimizes the quantity and harmfulness of waste, uses a single method, such as risk assessment, for estimating and comparing environmental problems, and involves complementary use of objectives and limits. An effective integrated approach includes action based on sustainable development, use of clean technologies and less harmful substances, application of the precautionary principle, and public information and participation during the evaluation of the effects of new substances and proposed activities.

A. INTERNATIONALLY MANDATED DOMESTIC LAWS AND POLICIES

1. Prior Assessment of Activities

Prior assessment of the environmental impacts of proposed activities originated in the United States in the late 1960s. Throughout the 1970s and early 1980s, international agreements began imposing environmental impact assessment (EIA) requirements that were increasingly broad in their scope and detailed in their requirements and provisions. At present, environmental impact assessment is singularly important in both domestic and international environmental law. International instruments commonly provide that states should not undertake or authorize activities without prior consideration, at an early stage, of their environmental effects. Some recent agreements have also required risk assessment, and a few refer to strategic environmental evaluation or assessment (SEE or SEA). Each of these is discussed below.

a. EIA

Some of the earliest EIA provisions were written into regional seas agreements based on the obligation to assess activities risking significant harm to the marine environment. The 1982 UN Convention on the Law of the Sea (UNCLOS), Art. 2, provides:

When states have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments.

This obligation broadly applies to any part of the marine environment, including marine waters under national jurisdiction. The Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-Based Sources (1985), Art. 12, is similar: “States should assess the potential effects/impacts, of proposed major projects under their jurisdiction or control, particularly in coastal areas, which may cause pollution from land-based sources, so that appropriate measures may be taken to prevent or mitigate such pollution.” Art. 4 of the UN Framework Convention on Climate Change (1992) also calls for using EIAs as a tool to minimize adverse anthropogenic impacts on the global climate.

Environmental impact assessment is required in a transboundary context by the Espoo Convention (Feb. 25, 1991). The treaty mandates an environmental impact assessment procedure for listed activities that are “likely to cause significant adverse transboundary impact.” In the Treaty, impact is defined more extensively than it is in many national laws and means any effect caused by a proposed activity on the environment, including human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors; it also includes effects on cultural heritage or socio-economic conditions resulting from alterations to those elements. For such projects, the party of origin must prepare an EIA.

An appendix to the Convention lists 17 activities subject to the EIA requirement, including crude oil refineries, thermal and nuclear power stations, treatment, storage, and disposal of radioactive waste, smelting, asbestos factories, chemical installations, road and rail construction, oil and gas pipelines, ports, toxic and dangerous waste disposal, large dams and reservoirs, groundwater abstraction, pulp and paper manufacturing, major mining, offshore oil production, storage of petroleum and chemicals, and major deforestation. Non-listed activities may be subject to the Convention requirements if the party of origin and the affected party or parties agree.

To determine the significance of the activity to the environment, criteria are provided. Appendix III of the Treaty provides criteria that include size, location, and effects, including those giving rise to serious effects on humans or on valued species or organisms, those which threaten the existing or potential use of an affected area, and those causing additional loading, which cannot be sustained by the carrying capacity of the environment.

The Espoo Convention sets out in detail the procedural and substantive aspects of the required environmental impact assessment. First, each state must notify the potentially affected party as early as possible of any proposed, listed activity likely to cause significant adverse transboundary impact. The latter has the right to participate in the environmental impact assessment procedure if it wishes. The public in the affected area—both inside the state of origin and in other states—also has the right to be informed of and to participate in the assessment procedure.

The environmental impact assessment documentation submitted by the originator must contain at a minimum:

1. a description of the proposed activity and its purpose;
2. a statement of the reasonable alternatives including a no-action alternative;
3. information on the environment likely to be significantly affected and alternative sites;
4. the potential environmental impact of the proposed activity and its alternatives and an estimation of its significance;
5. a description of mitigation measures to keep adverse environmental impact to a minimum;
6. an explanation of predictive methods and underlying assumptions, as well as the relevant environmental data used;
7. an identification of gaps in knowledge and uncertainties encountered in compiling the required information;
8. where appropriate, an outline for monitoring and management programs and plans for post-project analysis, and
9. a non-technical summary, including a visual presentation.

Art. 6(1) delineates the manner in which a final decision should be reached, requiring the party of origin to take “due account” of the environmental impact assessment documentation, as well as the comments thereon received, and the outcome of the consultations as referred to in Art. 5. The party of origin should consider possible alternatives to the proposed activity and measures to mitigate significant adverse impacts. Once the final decision is reached, the party of origin must notify the affected party of the decision, along with the considerations that form its basis. Finally, Art. 6 anticipates the situation when new information is obtained that was not available at the time the final decision was made, but before

work on the project has begun. If this occurs, Art. 6(3) requires the parties to consult to determine if the decision should be revised.

The last step in the procedure is post-project analysis, an important addition to the Convention. Art. 7(1) provides that the concerned parties should determine what manner of post-project analysis needs to occur, suggesting monitoring of the project as a preferred method. If either the party of origin or an affected party determines that there is a significant adverse transboundary impact, the parties then consult to determine what measures should be taken to mitigate or eliminate the adverse impact. Measures may include evaluating compliance with the conditions of approval of the activity and the effectiveness of mitigation measures, as well as verification of past predictions in order to utilize the results for future activities of the same type.

A second international agreement relying on and mandating EIAs is the Madrid Protocol on Environmental Protection of the Antarctic (Oct. 4, 1991). Art. 3 sets forth the general environmental norms which apply to all Antarctic activities, while Art. 8 and Annex I detail the requirements for prior impact assessment. All activities for which advance notice is required under the Antarctic Treaty, pursuant to scientific research programs, tourism, and all other governmental and non-governmental activities in the Treaty area, shall be subject to national assessment “in the planning processes leading to decisions” to undertake them and when there is any proposed change in the activities. No final decision may be taken to proceed with the proposed activity until a meeting of the Antarctic Treaty Consultative Parties (those conducting substantial research activities in Antarctica) has had an opportunity to evaluate the project and make comments for a period of up to 15 months. A final evaluation, on which any decision to proceed must be based, is then prepared and must be made public for 60 days before activity can begin.

MEAs base the requirement to conduct EIAs on a variety of factors, including:

1. lists of categories of activities that by their nature are likely to have significant effects;
2. lists of areas that are of special importance or sensitivity (such as national parks); the impact of any activity within or affecting such areas must be assessed;
3. lists of categories of resources or environmental problems that are of special concern;
4. an initial environmental evaluation of all activities, a quick and informal assessment to determine whether the effects are likely to be significant;
5. defined and listed criteria which make an impact “significant.”

Most multilateral environmental agreements (MEAs) that mandate EIA procedures also include provisions requiring consultation and dissemination of information to the public. For example, the 1986 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, Art. 16(3), requires states parties to share the information gathered in the assessment with the public and affected parties. The Convention on Biological Diversity (1992) similarly emphasizes public participation as a goal of environmental assessment in Art. 14(1)(a), and includes a notification and consultation requirement in Art. 14(1)(c). This Convention expansively requires assessment of national *policies*, as well as of proposed projects. Art. 14(1)(d) of the Convention contains emergency clauses, typically found in the more comprehensive EIA regimes, which allow immediate emergency action when there is grave danger to biological diversity.

It is also important to note that the World Bank and the regional banks all require environmental impact assessments. In October 1991, the World Bank issued an Operational Manual including Operational Directive 4.01 that describes its procedure of environmental assessment during project preparation and before appraisal, closely linked to a feasibility study of the project. The environmental assessment covers project-specific and other environmental impacts in the area influenced by the project. Its purpose is to ensure that the project options under consideration are environmentally sound and sustainable. All environmental consequences should be recognized early in the project cycle and taken into account in project selection, siting, planning, and design. The environmental assessment should also identify ways of improving projects, by preventing, minimizing, or compensating for adverse environmental impacts.

The Operational Directive distinguishes types of environmental assessment: project-specific, regional, and sectoral, where similar but significant development activities are planned for a localized area, for sector investment loans, and loans through intermediaries, emergency recovery projects, and larger issues, such as ozone depletion or pollution of international waters. The preparation of the environmental assessment is the responsibility of the borrower, but the Bank's task manager assists and monitors the project and screens it in order to determine the nature and extent of the environmental work required. After the screening, the project is assigned in one of three categories:

- Category A: A full environmental assessment is required;
- Category B: Environmental analysis is required, but not a full one;
- Category C: No environmental assessment is required.

The Operational Directive includes checklists of potential issues for an environmental assessment. It also proposes outlines and models for the assessment and prescriptions for the assessment and the screening procedures.

The Bank expects the borrower to ensure coordination among government agencies and to take into account the views of affected groups and local NGOs. It also requires the borrower to provide relevant information to affected groups and local NGOs and to hold meaningful consultations with them. The environmental assessment should form part of the overall feasibility study or project preparation and be submitted to the Bank which decides on the loan.

b. Risk Assessment

The concept of risk, meaning the possibility or likelihood of adverse consequences from a given action, is prominent in international environmental law. All human actions, including human interaction with nature, involve some risk of causing harm. Managing and reducing risk is the basic objective of many environmental policies, legislation, and regulation. Activities posing certain known risks are highly regulated, including industrial activities; airline, rail, and automobile transportation; products containing toxic substances like mercury or lead.

The concept of risk is inherently uncertain, however, because if a given result is certain or it is impossible, there is no risk. Risk concerns the probabilities in between the two extremes of certainty and impossibility and requires knowledge of the entire range of potential impacts of substances and actions. Risk assessment may be considered part of the precautionary principle, because it attempts to evaluate the probabilities of various harms resulting from a proposed activity on the basis of which a decision can be taken. From a legal perspective, once a *prima facie* case is made that a risk exists, the burden may be placed on the polluter to minimize or eliminate the risk. EC law, for example, prohibits the introduction of new substances on the market until they have been proven to be safe. See Art. 7 of Directive 67/548/EEC on the Approximation of the Laws, Regulations and Administrative Provisions of the Member States Relating to the Classification, Packaging, and Labeling of Dangerous Substances, 1967 O.J. (L 96/1), amended, *inter alia*, by Directive 93/21/EEC, 1993 O.J. (L 110/20).

The criteria for assessing risk involve the probability and magnitude of harm. For many industrial activities, both the likelihood and the nature of harm are well understood. Other risks can only be estimated, because there is no prior human experience with them: LMOs, ozone depletion, anthropogenic climate change, and endocrine disrupting substances, for example, are all governed by uncertainty about the quantity and quality of risk associated with them, i.e., the likelihood of harm, the geographic range of the harm, and the character of damage (duration, reversibility, etc.). The reliability of any prediction will be affected by the complexity of the problem and the number of factors it is necessary to take into account.

Once the factors are assessed, policymakers must determine the acceptable level of risk, knowing that zero risk is an impossibility if the activity is

allowed to proceed. Some legal definitions speak of the “likely” or “evident” risks, based on technical knowledge of “serious or irreversible” harm. Proportionate measures may be required to avoid the harm. Other legal instruments set the threshold for responsive action at harms that are “non-negligible,” “appreciable,” or “significant.”

When policymakers or societies differ about the appropriate level of risk, providing information may be the primary legal obligation imposed. The Cartagena Biosafety Protocol requires that risk be assessed prior to the first intentional transboundary movement of an LMO for intentional introduction into the environment of the importing country. The Treaty leaves it to the importing state to decide whether or not to accept the risk. Risk assessment and informed consent thus form the heart of the Protocol’s regulatory process. Article 15 obligates states parties to carry out risk assessment in a scientifically sound manner, in accordance with Annex III and taking into account recognized risk assessment techniques and potential harm to human health. Developing countries may encounter difficulties complying with this obligation due to lack of scientific data, technology, financial resources, or biologists who are expert about LMOs. Given these problems, the Protocol permits developing parties of import to shift the costs of risk assessment to the notifying party, an application of the principle of common but differentiated responsibilities.

The application of risk assessment to products in international trade implicates the international trading regime. WTO cases show that panels require the identification of real risks as a *sine qua non* for trade barriers to be compatible with the GATT/WTO regime and especially with bans permitted by the Sanitary and Phytosanitary Agreement (SPS). In a series of cases, the dispute settlement panels and the Appellate Body have established the contours of a GATT-acceptable risk assessment procedure: (1) risk assessments should set out both the prevailing view and opinions taking a divergent view; (2) there is no requirement to establish a threshold or minimum level of risk, and states may set zero risk as the level they will accept; (3) risk must be ascertainable and not theoretical, but ascertainable potential is enough; (4) the criteria used by the state must include all risks and their origins with a degree of specificity. Perhaps most importantly, there must be a rational or objective relationship between the trade-restricting measure and the scientific evidence. See, e.g., *Australian Measures Affecting the Importation of Salmon*, WTO Doc. WT/DS18/AB/R (Oct. 20, 1998); *Japan—Varietals, Measures Affecting Agricultural Products*, WTO Doc. WT/DS76/AB/R (Feb. 22, 1999).

In cases where it is not possible to conduct a proper risk assessment, Art. 5(7) of the SPS Agreement allows members to adopt and maintain a provisional SPS measure. According to WTO panels and the Appellate Body, this provision incorporates the precautionary principle to a limited extent, when four cumulative criteria are met: (1) the relevant scientific information must be insufficient; (2) the measure should be

adopted on the basis of available pertinent information; (3) the member must seek to obtain the additional information necessary for a more objective assessment of risk; (4) the member must review the measure within a reasonable period of time established on a case-by-case basis depending on the specific circumstances. Relevant circumstances include the difficulty of obtaining additional information and the characteristics of the SPS measure.

Environmental agreements require states to act once there is a “likelihood of” or a “reasonable concern for” harm. See Art. 4(3), Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (Jan. 29, 1991); Art. 2(5), Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Mar. 17, 1992); Art. 3(2), Convention on the Protection of the Baltic Sea Area (Apr. 9, 1992); Art. 3(3), UN Framework Convention on Climate Change (May 9, 1992). Cost/benefit analysis is not included in the treaty formulations; thus, states are not allowed to consider the costs of regulation, for example, in determining whether transboundary water pollution is likely to cause significant adverse effects and thus crosses the threshold where action is required. In practice, states often weigh the benefits of the proposed activity against the magnitude and probability of occurrence of the risks identified and the cost of mitigating measures, in determining appropriate responses. In any event, states must assess how serious a given risk is in relation to other risks and allocate resources accordingly. Consideration may and should be given to extended latency periods that may exist between exposure and effects, with potential cumulative impacts, and irreversibility of harm. As a result, abatement may be required of relatively remote dangers.

Risk assessment thus addresses the issue of scientific uncertainty in a procedural manner, documenting each part of a process that is accessible or transparent to all key parties. There are several defined steps, beginning with hazard identification (the possible consequences of the proposed action) and risk characterization (estimating the magnitude and distribution of risks based on assessments of the qualities of the substance or action under review and the extent and nature of exposure). Alternatives to the action are then identified and compared, as are risk management strategies, on the basis of costs, technical and administrative feasibility, and distributive consequences. Once a risk management strategy is chosen, it is implemented, reviewed and, if necessary adjusted.

c. Strategic Environmental Evaluation

Strategic Environmental Evaluation (SEE) or strategic environmental assessment (SEA) is an advanced form of impact assessment procedure that was developed by the World Bank. It is a comprehensive and integrated process for evaluating environmental plans, policies, and programs

along with their social and economic impacts early in the decision-making process. It can and should be adapted to the specific circumstances of different states or regions. Some of the characteristics of a SEE are:

- Its perspective is more general than that of an EIA. Rather than considering a specific project, it assesses and develops general guidelines for an entire economic or social sector (e.g., transport, energy, poverty reduction);
- It aims to influence the macro level of decisionmaking to develop policies that could be the basis of future laws;
- It can be adapted to different activities and proposed projects in the sector for which it is elaborated and allows for combination with programs and policies for other sectors;
- SEE normally includes consultation with the potential stakeholders over the long term rather than just at the outset;
- SEE sector guidelines can be a cost-effective basis on which to evaluate future projects in the public domain.

2. Regulatory Measures

The duty to prevent environmental harm requires the adoption of measures to avoid harm and reduce or eliminate the risk of harm. Many international agreements dictate or suggest the type or content of implementing laws and regulations deemed necessary or appropriate. Overall, states must make efforts to prevent environmental damage that is foreseeable through the normal operations of an activity or the use of a product and prevent or mitigate accidental transboundary harm. Laws and regulations generally should apply to all activities and products within the state, whether of foreign or domestic origin, to comply with international trade rules.

Treaties often contain a general obligation to apply the best available technology (BAT) or use the best practicable means. This requirement can be seen as deriving in part from the customary international obligation of “due diligence” to prevent environmental harm. Several international texts define best available technology or related terms. The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, Mar. 17, 1992) defines “best available technology” in Annex I as

the latest stage of development of processes, facilities or methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste.

The Convention for the Protection of the Marine Environment in the North-East Atlantic defines the similar term “best available techniques” as

the latest stage of development (state of the art) of processes, of facilities or of methods of operation which indicate the practical suitability of a particular measure for limiting discharges, emissions and waste.

The same instrument defines the term “best environmental practice” as the application of the most appropriate combination of environmental control measures and strategies ranging from education and information to establishing a system of licensing.

To aid states in determining which are the best available technologies, techniques, or practices, some international agreements specify criteria to which special consideration shall be given. These include: comparable processes, technological advances and changes, economic feasibility, time limitations, the nature and volume of the discharges and effluents concerned, low and non-waste technology.

Public authorities may require activities within their jurisdiction to apply the best available technology or techniques and verify their application through authorization, permits, licenses and monitoring, or through other administrative or judicial enforcement.

a. Standard-Setting

International agreements sometimes call on states parties to establish standards for products and processes that impact the environment. Standards are prescriptive norms that govern products or processes or set limits on the amount of pollutants or emissions produced. Four categories of standards are common: process, product, emission, and quality standards.

In international environmental law, process standards specify design requirements or operating procedures applicable to fixed installations, such as factories, or designate permissible means and methods of activities like hunting or fishing. Sometimes, a particular process or technique is imposed on operations, such as the installation of purification or filtration systems in production facilities. International process standards include the requirement that hazardous waste be incinerated (1991 Antarctic Environment Protocol), the ban on driftnet fishing (1989 Wellington Driftnet Convention), and operating procedures for biotechnology (EU Directives).

Process standards often are used to regulate the operations of particularly hazardous activities or substances. In a far-reaching provision, the Montreal Protocol on the Ozone Layer calls on states parties to determine the feasibility of banning or restricting the import from non-state parties of products *produced with*, but not containing, ozone-depleting substances. The provision is unusual in regulating trade with non-parties and because process standards that apply to imported products raise questions about their compatibility with the international trading regime set up under GATT and the WTO.

Product standards, in contrast, are used for items that are created or manufactured for sale or distribution. Such standards may regulate:

- The physical or chemical composition of items, such as pharmaceuticals or detergents. Examples include regulations that control the sulphur content of fuels or list substances whose presence is forbidden in certain products, for instance, mercury in pesticides.
- The technical performance of products, such as maximum levels of pollutant or noise emissions from motor vehicles or specifications of required product components, such as catalytic converters.
- The handling, presentation, and packaging of products, particularly those that are toxic. Packaging regulations may focus on waste minimization and safety.

For economic reasons, product standards usually are adopted for an entire industry. In general, standards for new products are drafted to reflect the best available pollution control technology, in some cases requiring a percentage reduction of pollutants emitted in comparison with older sources. International product standards include the 1991 Amendments to MARPOL 73/78 requiring construction of new oil tankers with “double hulls,” the ban on trade in products containing ozone-depleting substances (1987 Montreal Protocol, Art. 4(3) as amended), and the requirement to provide unleaded fuel for motor vehicles (Sofia Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution, Art. 4).

Emission standards are required by international agreements, such as the Protocols to the 1979 Convention on Long-Range Transboundary Air Pollution and the regional seas agreements. They call on states parties to specify the quantity or concentration of pollutants that can be emitted in discharges from a specific source. As a general rule, emission standards apply to fixed installations, such as factories or homes; mobile sources of pollution are more often regulated by product standards. Emission standards establish obligations of result, leaving to the polluter the choice of means to conform to the norm. Often the environmental milieu of the discharge, e.g., groundwater, air, soil, is a variant factor. Emission standards may also change according to the number of polluters and the capacity of the sector to absorb pollutants. Different standards may be imposed in response to particular climatic conditions, for example persistent fog or inversion layers.

Emission standards are based on several assumptions: (1) a certain level of some contaminants will not produce any undesirable effect; (2) there is a finite capacity of each environment to accommodate substances without unacceptable consequences (the assimilative capacity); and (3) the assimilative capacity can be quantified, apportioned to each actor, and utilized. Each of these assumptions has been questioned, because all chemicals discharged into the environment are likely to lead to statistically

significant deterioration. Pollution occurs when the effects of the contamination can be measured. Emission standards most often reflect a political decision about the amount of pollution that is deemed acceptable.

Finally, quality standards fix the maximum allowable level of pollution in an environmental milieu or target during normal periods. A quality standard may set the level of mercury permissible in rivers, the level of sulfur dioxide in the air, or noise level of airplanes in the proximity of residential areas. Quality standards often vary according to the particular use made of the environmental resource. For example, different water quality standards may be set for drinking water and for waters used for bathing or fishing. Quality standards also can vary in geographic scope, covering national or regional zones, or a particular resource, such as a river or lake, but each quality standard establishes base norms against which compliance or deviance are measured. The 1992 UN Convention on the Protection and Use of Transboundary Watercourses and International Lakes calls on each party to define, where appropriate, water-quality objectives and to adopt water-quality criteria, setting forth guidelines for this purpose in Annex III. Some bilateral and regional agreements on freshwaters and air foresee or mandate water-quality objectives, as well.

b. Restrictions and Prohibitions

If an activity, product, or process threatens environmental harm, strict measures can be imposed in an effort to reduce or eliminate the harm. When the likelihood of harm is too great, the measure may call for a total product or process ban. The numbers and types of restrictions are almost unlimited, but certain ones are commonly used.

Environmental treaties often call for restricting or banning hazardous products, processes, or activities. They frequently are named in easily amended lists appended to the treaty. Such lists permit individualizing situations and give the agreement some flexibility. Lists also avoid too much technical detail being included in the basic text. The use of lists is very common in combating pollution by dumping of wastes, discharge of hazardous substances during normal operations, and the protection of wild flora and fauna, especially endangered species.

Lists have been widely employed in protocols to environmental treaties, beginning with the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, Nov. 13, 1972). This Agreement has two lists, the first containing those substances absolutely prohibited (the black list) and the second list setting forth those substances that must be licensed for disposal (the grey list). The model of black and grey lists it established was subsequently employed in UNEP regional seas agreements for controlling land-based sources of pollution. Substances are classified and limits established on the basis of their toxicity, persistence, and bioaccumulation.

Recent work has sought to estimate the “critical loads” and “critical levels” of pollutant concentrations, as developed in the context of the 1979 Convention on Long-Range Transboundary Air Pollution. Critical load is defined in Art. 1(7) of its NO_x Protocol as “a quantitative estimate of the exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge.” Art. 1(8) of the Volatile Organic Compounds Protocol defines the related notion of critical level: “concentrations of pollutants in the atmosphere for a specified exposure time below which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials do not occur according to present knowledge” whose discharge is prohibited or submitted to prior authorization.

Critics of the listing approach claim that its utility is limited, because it is inherently responsive to previously identified problems, is often based upon uncertain dose-response relationships, and is not specific or flexible enough to be truly protective. Several hundred new substances are introduced each year and may cause considerable harm before their environmental impacts are known, especially given the possibilities that pollutants are transformed after coming into contact with others upon release. Setting legal limits for the acceptable concentration of substances requires a judgment on the amount of damage that is acceptable as a consequence of human activities and how much the population is willing to pay for reducing or lowering the risks of such damage.

The listing approach also raises practical problems in enforcement. A substance, such as mercury or cadmium, usually is discharged in the environment as a component of many different products rather than in its pure form. To implement the 1976 Convention related to the Protection of the Rhine against Pollution by Chemicals, for example, an investigation was conducted into the uses of most of the listed substances. It was estimated that the number of listed substances and materials had to be multiplied by hundreds to take into account all compounds containing them. As a result of such problems, some conventions have moved to “reverse listing,” specifying in annexes those substances or activities that are permitted rather than those that are prohibited. The 1989 Basel Convention on Transboundary Movements of Hazardous Wastes adopted this approach, prohibiting all discharges except those that are explicitly authorized in individual cases. Its annexes list categories of wastes not only according to constituent substances and materials, but also according to their generating activities (e.g., clinical wastes, wastes from the production, formulation, and use of organic solvents) and hazardous characteristics (e.g., explosive, flammable, poisonous). The 1992 Convention on Protection of the Baltic Marine Environment also uses reverse listing. The precautionary approach suggests that the method of reverse listing is justified, because it requires those seeking to act or to release a new substance or product to prove that it will cause no significant harm.

Treaties for the protection of biological diversity frequently require the imposition of limits on taking specimens of protected resources. General protective measures may restrict injury to and destruction or taking of some or all wild plants and animals. The revised African Convention on the Conservation of Nature and Natural Resources (Maputo, July 11, 2003), requires adoption of adequate legislation to regulate hunting, capturing, and fishing, and to prohibit certain means of hunting and fishing. Art. 9. Annexes specify measures to be taken regarding threatened or endangered species, which benefit from the most stringent protective legal measures. Hunting and collecting restrictions prohibit non-selective means of killing or capturing specimens of wildlife. The 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats similarly includes a special Appendix listing prohibited means of hunting mammals and birds.

Migratory species are subject to special protection by treaties, such as the 1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals, which is aimed at all range states, i.e., those through which such species transit and in which they spend part of their lives. States parties to the Bonn Convention are obliged to ban or regulate the taking of these animals in cases where the conservation status of such animals—the sum of influences on their long-term distribution and abundance—is unfavorable.

Taking restrictions and prohibitions may apply to non-living as well as living resources, although such measures are imposed more frequently for flora and fauna. Principle 5 of the Stockholm Declaration states that “the non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment are shared by all mankind.” International agreements regulate the taking of non-living resources in international commons areas (the deep-seabed, Antarctica, and outer space), and shared freshwater resources.

c. Land Use Regulation

Land use controls play a major role in environmental law for both urban and rural areas, through zoning, physical planning, and the creation of protected areas. The Convention on Biological Diversity, the Ramsar Wetlands Convention, the World Heritage Convention, regional seas protocols on specially protected areas, and other global and regional nature protection agreements mandate land use regulation by states parties. In a broad sense the entire Antarctic Treaty system can be viewed as international regulation of this type.

Zoning helps equitably distribute activities harmful to the environment in order to limit potential damage and allows application of different legal rules from zone to zone for more effective protection. Physical planning

merges provisions for infrastructure and town and country planning in order to integrate conservation of the environment into social and economic development.

Land use planning and zoning regulations are often expressed in negative terms, as prohibitions or restrictions on any undesirable utilization or change in utilization of the area, but planning also may encourage and promote land uses that are considered economically beneficial or compatible with environmental objectives and land use management plans. Because of the evolution of environmental protection schemes and the numerous levels of government involved, land use regulations can become extremely complex.

Several international environmental instruments require states parties to set aside areas for specific management and the *in situ* conservation of biological diversity. Other special areas are mandated to protect monuments and sites of outstanding importance for geological, physiographical, paleontological, or other scientific reasons, or for aesthetic purposes. "Buffer zones" surrounding protected areas help preserve them from harmful outside influences. Activities that do not have adverse effects on the protected area may be allowed to continue. "Interconnected corridors," created through land use regulations or private contracts and other incentives, are necessary to allow genetic exchanges to occur between protected areas and may be international in scope. Corridors can be linear, such as along river banks if natural vegetation is maintained, or may consist of strings or patches of natural vegetation from which animals (and plants) can move. Some corridors have been established regionally. See, e.g., Agreement on the Mesoamerican Biological Corridor (1996). Effective use of protected areas requires comprehensive conservation and management plans.

d. Licensing

Licenses represent a middle ground between unregulated practices and absolute prohibition. Most treaty-based licensing systems operate on the basis of a list or an inventory of activities necessitating a license, because they pose foreseeable risks to the environment. These lists may constitute part of the basic agreement or be contained in a supplementary legal instrument, as in the Annexes to the London Dumping Convention. Most agreements make no distinction between profit-making and non-profit-making enterprises, except that they often exempt military operations from their scope. Licenses are also required under many agreements regulating takings of shared natural resources like fish or freshwaters.

EU Directive 85/337/EEC plays a significant role in licensing procedures in Europe. Its Art. 6 provides that any demand for authorization of a public or private project that could have effect on the environment, as well as information received on this subject, should be made public. States

also should ensure that opportunity is given to concerned members of the public to express an opinion before the project is approved, establishing the means to provide information and consultation. The particular characteristics of the projects or sites concerned may determine what sector of the public is affected, control the location where the information can be consulted, and establish the particular methods of information (poster, newspapers, displays). States also may determine the manner according to which the public should be consulted, whether it is by written submission, public inquiry, or other, and fix the appropriate time limits for the various stages of the procedure. Once the inquiry is closed, the authority may grant a license with appropriate conditions or give partial or temporary authorization or refuse a license entirely. If the license is refused, there may be grounds for appeal to a judicial body for review of the decision. In most cases, there are both time limits and restrictions on who may take the appeal.

International requirements obliging states parties to license items in international trade are increasing, part of the strong trend toward transparency attending the movement and use of substances, products, and activities that may have a negative impact on the environment. The delivery of *export* licenses and permits is often subject to the prior authorization of the *importing* state. Such consent is required by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes. The 1998 Convention on Prior Informed Consent, which emerged from earlier non-binding principles drafted under the auspices of UNEP and FAO, extends the system of double authorization to hazardous substances and products others than wastes. It also represents a step towards interstate recognition of national permits. Such a practice is already found in the acceptance by other states of flag state certification that marine vessels conform to international legal standards. The 1977 International Convention for the Safety of Fishing Vessels was one of the first to establish that certificates issued by one party according to the provisions of the Convention shall be accepted by other parties as having the same validity as one issued by them. Art. 4. In 1989, the OECD similarly mandated the mutual recognition of data on chemical hazards provided by states who assure that test data have been generated in accordance with good laboratory practices.

3. Economic Measures

As an alternative to the regulatory approach, some international instruments recommend that states make efforts to influence the decisions of state agents and non-state actors who organize their activities by comparing the benefits and costs of their available options. Limiting their options, altering the cost and/or benefits, or altering the priorities and significance agents attach to their actions can influence preferences. Economic measures provide incentives or disincentives to behavior. They most often result

from legal instruments introducing taxes, subsidies, or other measures based on the polluter pays principle.

International environmental texts increasingly mandate or recommend use of economic instruments and market mechanisms for environmental protection. Principle 16 of the Rio Declaration calls on national authorities to promote the internalization of environmental costs and the use of economic instruments, taking into account the polluter pays principle, “with due regard to the public interest and without distorting international trade and investment.” Agenda 21 also calls for the effective use of economic instruments, as does the Convention on Biological Diversity. In the latter text, the parties undertake to provide financial support and incentives for national activities intended to achieve the objectives of the Convention.

Most international instruments do not attempt to define or list “economic instruments,” but instead enumerate the major relevant categories. The OECD addressed the subject of economic instruments in a Council regulation on their use in environmental policy, adopted January 31, 1991. The regulation recommended that member countries make greater and more consistent use of economic instruments, such as charges and taxes, marketable permits, deposit-refund systems, and financial assistance, to complement other policy instruments, on both national and international levels. An Annex provided guidelines for the use of economic instruments, establishing five sets of criteria:

- Environmental effectiveness, determined by the ability of polluters to react to the incentives provided;
- Economic efficiency, achieved by an optimal allocation of resources. It implies that the economic cost of complying with environmental requirements is minimized;
- Equity in regard to the distributive consequences;
- Administrative feasibility and cost, including the ease and cost of monitoring, given the existing legal and institutional arrangements;
- Acceptability. “It is of crucial importance that target groups be informed and consulted on the economic instruments imposed on them. In general, the success of any (economic) instrument requires certainty and stability over time with respect to their basic elements.”

OECD Council Regulation on the Use of Economic Instruments in Environmental Policy (Jan. 31, 1991).

Incentives are applied not only internally but internationally to encourage participation in a multilateral treaty regime. The 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, for example, granted a ten-year implementation period to developing countries, and EC members were allowed to aggregate their national consumption limits.

On the national level, economic incentives include not only direct investment subsidies but also preferential loans, accelerated depreciation allowances, tax differentials, tax exemptions, credits, and other promotional measures. Often such measures aim to include the cost of environmental damage, as well as the cost of raw materials, production, marketing, etc., in the price of a product. Even the concept of “product” changes, as the consumption of fresh air and clean water becomes priced and polluters pay, through fees or taxes, for causing deterioration to these resources.

In some countries, government financial assistance and incentives, taking the form of low-interest loans or grants, aid the construction and operation of more environmentally safe installations and recycling systems. International instruments like the Convention on Biological Diversity (June 5, 1992) and Framework Convention on Climate Change (May 9, 1992) do not often refer to loans, but speak of grants and “concessional” access to funds. Environmental funds, which have been created in several countries, often directly finance environmental protection. Subsidies can include fiscal measures, such as reduced taxes on anti-pollution activities, accelerated depreciation allowances, and favorable interest rates for anti-pollution investments. To be legal under GATT/WTO, such subsidies should not create significant distortions in international trade and investment. Subsidies to new polluting installations are generally prohibited; however, public authorities may aid research and development for the purpose of stimulating experimentation with new pollution control technologies and development of new pollution abatement equipment. They also may subsidize anti-pollution investment in the framework of regional, industrial, social, agricultural, and scientific policies or whenever new environmental protection measures would create serious economic dislocations.

Subsidies are a particular problem in respect to exploitation of living resources. Subsidies can allow the expansion of fishing fleets by, e.g., supporting the building of new, larger ships or allowing purchase of new equipment; or they can simply hinder the reduction of fleets by supporting economically unsustainable capacity. Subsidies have the effect of slowing the exit of capital from the fishing industry even when it is in difficulty because of overcapacity and declining catches.

During discussions of the WTO Committee on Trade and Environment in 1997–98, governments disagreed over the impact of subsidies on the status of fish stocks and whether subsidies should be singled out for special treatment. Several large countries argued that subsidies have a negative conservation impact. Other participants disagreed and argued that fisheries management should be dealt with in a comprehensive manner. In preparation for the 1999 multilateral trade round, states calling themselves “Friends of the Fish” (Australia, Iceland, New Zealand, Peru, Philippines and United States) formed a group to promote conservation and sustain-

ability of fish stocks. Various organizations studied the impact of subsidies on overfishing but no agreement was reached.

In late 2000, FAO convened an Expert Consultation on Economic Incentives and Responsible Fishing that reviewed and reported on the impacts of subsidies on fishery resources and on trade. Resolving the problem is difficult in part because it is not easy to determine what is a subsidy. It may be considered, for example, that states that cover any significant part of the effective costs of access by their nationals to a foreign fishery are, in effect, subsidizing their fishing fleet. Such indirect subsidies are imbedded in international fishing access agreements through an agreed level of compensation for distant water fishing fleets to have a specific level of access to a fishery. Unfortunately, to obtain the income, states sometimes grant access to already fully exploited or even overexploited fisheries. Japan has argued that the negative impacts of subsidies can be minimized if appropriate management and conservation measures are taken. One economic model suggests that as long as the Total Allowable Catch does not rise, subsidies have minimal impact, because the subsidy simply transfers resources among members of the industry. The major problem is that for many fisheries there is no established Total Allowable Catch.

Virtually every major fishing state has used a decommissioning scheme over the past three decades to reduce overcapacity in its fishing fleet. The question of whether this can be considered as an environmental subsidy given a special status within a fisheries regime remains open. Many states strongly assert that aid to decommission fishing vessels should be considered a benefit to the industry and the environment, because reducing the fishing fleet in all likelihood reduces the total catch and improves profits for those who continue to fish. Transfers aimed at capacity reduction, combined with other conservation measures, can reduce pressures on fish stocks. The result may be neutral at best, however, unless those who remain are discouraged from expanding vessel capacity or obtaining more efficient gear to take more fish.

Decommissioning can be overwhelmed by “input stuffing” to expand take among those who remain in the industry. In addition, with decommissioning, the value of a license becomes more valuable to those who remain, making vessels more valuable and stimulating increased investment in fishing capacity. Decommissioning funds may be used to buy bigger, faster, and better-equipped vessels. Decommissioned vessels may simply reappear as ships using the flag of a different country. Some stricter measures have been taken, such as limits on “days at sea” or prohibitions on re-entry of decommissioned vessels. The problem is to ensure that the catching power of the vessel does not increase to equal or surpass the loss occasioned by decommissioning.

Mandatory insurance is yet another regulated economic instrument. Governments by law and based on treaty obligations may impose an oblig-

ation on those conducting environmentally hazardous activities to insure against liability for damage caused to third parties, the state, or the local authorities. Several multilateral treaties include provisions that require the maintenance of insurance or other financial security for the payment of damages in the case of liability. See, e.g., the Convention on Third Party Liability in the Field of Nuclear Energy (1960); Convention on the Liability of Operators of Nuclear Ships (1962); Vienna Convention on Civil Liability for Nuclear Damage (1963); International Convention on Civil Liability for Oil Pollution Damage (1969); and Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (1993). Insurance can have a positive influence on the behavior of companies by putting pressure on them to act in an environmentally sound way; insurance companies do this to avoid high payouts for environmental accidents. In the same way, investor concerns may impact company behavior.

Disputes over the application of exceptions to insurance coverage, especially over broad interpretations of “accidental pollution” clauses, led to the introduction of pollution exclusion provisions in the 1980s, completely eliminating coverage for pollution, whether or not the source was sudden and accidental. The insurance industry then began offering, on a limited basis, environmental impairment liability coverage at premiums several times higher than the average policy. Coverage is narrowly drawn, often excluding the cleanup of hazardous waste dump sites and including only gradual escape of pollutants from the insured’s property. In addition, policies typically cover tangible property loss or damage, but exclude such consequences as loss of use of a facility caused by toxic air pollution in the area. Nonetheless, several environmental regulatory programs require insurance coverage as a pre-condition to licensing or issuance of required permits. In some cases, letters of credit, trust funds, or solvency tests may be substituted for insurance.

In recent years, insurance companies in several countries have formed pools to underwrite new, relatively unknown pollution risks under a controlled regime of environmental legislation. Unlike earlier policies, these have a tendency to extend coverage to gradual pollution risk; however, there is generally no coverage for expenses incurred for the restoration and reconstruction of the insured’s operating equipment or installation grounds.

Another consequence of increasing environmental liability has been the rise in environmental audits. The environmental audit or independent review, sometimes referred to as the ecoaudit, has come to serve two purposes. First, it is a legislative control mechanism of growing popularity. Second, it is a device of importance to businesses during sales, acquisitions, and other transactions involving assets, where the risk of liability for environmental non-compliance can be a crucial element in negotiations and contracts. It differs from environmental monitoring, because it is not a continuous process but an overall evaluation at a specific moment. The

main elements of the environmental audit are the introduction of a systematic approach by companies to setting environmental standards; self-assessment by companies of their performance; an independent body to audit companies; and companies' right to use a certified statement of their participation in the scheme. The regulation includes criteria for accrediting environmental verifiers and a listing of their functions.

Both the 1991 Espoo Convention on Environmental Impact Assessment in a Transboundary Context and EC regulations suggest use of environmental audits. In 1993, the European Union adopted an ecomanagement and audit scheme, allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme. Council Regulation No. 1836/93, June 29, 1993, 1993 O.J. (L 168/1). The ecomanagement and audit scheme is intended to be a management tool, encouraging companies to apply high standards of environmental management and to evaluate the environmental impact of their activities. Although it is voluntary, participating companies must conform to the requirements of the Regulation's Annex I. The Annex requires the company policy to be in writing, to be regularly reviewed and revised if necessary, in particular in the light of environmental audits, and to be publicly available. Company policy must aim to comply with all relevant environmental requirements and to improve environmental performance continually. The company policy is also to include specific environmental targets and timetables.

Annex II sets forth the requirements of environmental auditing, referencing other international standards including those of the International Organization for Standardization (ISO). The objectives of each audit, which must take place at least once every three years, must include assessing the management systems in place and determining compliance with relevant environmental laws and regulations. Environmental audits, including on-site discussions, inspections, and reviews, must be performed by independent persons with appropriate knowledge of the sectors and fields audited. Written audit reports are submitted to the top company management and culminate in the preparation and implementation of a plan of appropriate corrective action. Mechanisms must be in place and in operation to ensure follow-up to the audit.

Ecoauditing can be part of the legal-administrative procedure for decisionmaking or part of the role of the judiciary. There can be parliamentary commissions of inquiry or studies by non-governmental environmental organizations, which play an important review role. Often research is undertaken by independent experts in the field. Environmental audits add an element of external quality control to the administrative system.

Apart from its function as a regulatory mechanism, environmental auditing forms a growing part of business transactions. With increasingly complex technology, company structures, and environmental regulations, it is sometimes difficult for management and authorities to remain fully

informed about the environmental consequences of company operations. This can result in hidden problems, leading to accidents, as well as to violation of environmental laws and regulations. Environmental management and auditing is the systematic investigation of the procedures and work methods of a company or institution, as they are relevant to its environmental responsibilities. It is designed to determine to what degree these procedures and methods are consistent with legal regulations and generally accepted practices. Purchasers of businesses may seek to have environmental representations and warranties or a determination of whether they will be assuming liabilities for environmental damage. This can involve physical inspection of property and assets, including any disposal site used in the processes carried out on the property; examination of documents, including all operating licenses and permissions; and physical and scientific analysis of processes, by-products, and waste streams. Specific investigation usually is made for any signs of past environmental misconduct that would lead to a claim of liability for environmental damage in the future. The results of the audit can govern the nature and extent of protection built into the contract covering acquisition of the company or asset.

Using another market mechanism, international environmental law in recent years has adopted the techniques of tradable emissions, joint implementation, and bubbles. A system of negotiable permits fixes total amount of pollution permissible within an area. Each polluting company is required to obtain an emission permit conforming to emission standards. Companies investing in processes that reduce pollution may exchange or sell their permits to other companies located in the same geographic area. Emissions trading is allowed in permits adding up to a limit determined by the authorities. Resource extraction concessions can also be issued and traded. Such tradeable permits leave allocation of polluting behavior to the market. The initial distribution of permits may be based on historic levels of emissions that, however, should not present an unacceptable risk of harm to those in that area. A periodic devaluation or phasing out of tradable permits may be appropriate with incentives for technological innovations.

Joint implementation is related to the idea of negotiable permits, and works at the international level. The UNFCCC allows industrialized countries to meet their obligations by financing or undertaking activities in other countries. Many states and scholars favor joint implementation for addressing anthropogenic climate change, because reduction in carbon dioxide emissions anywhere in the world should produce a positive effect in mitigating climate change. Based on this idea, the EU obtained the right to meet its obligations under the UN Framework Convention on Climate Change as a bloc, in effect creating a "bubble" over Europe. By a Decision 2004/156/EC (Jan. 29, 2004), the European Commission established guidelines for monitoring and reporting greenhouse gas emissions in order to establish a scheme for greenhouse gas emission allowance trading within

the Community. The monitoring of emissions includes emissions from regular operations, but emissions from internal combustion engines for transportation purposes are excluded from the estimates.

Art. 4(2) of the Climate Change Convention endorses the general concept of joint implementation. The Kyoto Protocol adds that any developed country, in order to meet its commitments, may transfer to or acquire from any other Annex I party “emission reduction units” for projects aimed at reducing emissions or enhancing anthropogenic removals by “sinks” that absorb greenhouse gases in any sector of the economy. The condition is that any such project reduce emission by sources or enhance removal by sinks beyond the amount that would otherwise occur. Kyoto Protocol Art. 6(1).

The argument in favor of such trading is that it lowers the overall cost of reducing emissions and may increase the amount of abatement that can be achieved. On a theoretical level, it may be questioned whether joint implementation violates the polluter pays principle by allowing polluters to continue their activities without paying full costs. Despite these concerns, some developing countries have actively sought joint implementation projects with developed countries and have benefited therefrom.

The final market mechanism to be mentioned is labeling of products. Labeling requirements are not new; they have been used to detail the nutritional content of foods, the proper use and hazards of cleaning products, and the dangers of cigarettes. However, broader environmental concerns recently have led to adapting the use of labels to promote environmentally “friendly” products. The “ecolabel” is an increasingly popular incentive to environmental protection. It is part of a gradual trend away from “end of the pipe” reactive solutions, which can be extremely costly, toward identifying and avoiding environmental problems before they occur. Environmental labeling programs constitute an economic instrument promoting pro-environmental purchasing on the side of the public and a precautionary approach on the side of industry.

Environmental labeling can involve regulations that insist upon accurate reporting of all the contents and dangers involved in a product. International instruments concerned with hazardous substances and products often call for adequate labeling of the dangers involved in the use of the substance or product. These instruments include the London Guidelines for the Exchange of Information on Chemicals in International Trade and the FAO Code of Conduct on the Distribution and Use of Pesticides. MARPOL, Annex III requires adequate labeling of harmful substances carried by sea.

Another method involves a public or private body awarding positive labels to inform consumers that the products are less destructive of the environment than similar competitive products, based on a holistic, overall judgment of the product’s environmental quality. As such, it differs from “negative” labels that warn of particular dangers and specific matters, such as the use of recycled materials. Labeling programs are very difficult to

administer due to the need to comprehensively assess the entire life-cycle of the product, provide financing, and establish product categories and criteria. However, their use continues to spread. The EU adopted Regulation 880/92, Mar. 22, 1992, 1992 O.J. (L 99/1), to create a Community system for awarding the ecology label, based on voluntary participation of manufacturers.

Like all forms of environmental regulation, each economic incentive must be studied to evaluate its effectiveness in protecting the environment. Effectiveness requires analysis of the changes of producer and/or consumer behavior and the costs of the measures taken. Some procedures may have only small effect while being administratively cumbersome and thus do not meet the requirements of efficiency or effectiveness. On the other hand, incentives for environmental protection may contribute to economic growth, as well as preserve natural resources.

In conclusion, despite the variations in international agreements and national strategies and legal systems, certain common issues arise in deciding upon adoption of specific techniques of environmental protection. These are always subject to national priorities and conditions. First, the law should be predictable, understandable, and enforceable, drafted with the participation of relevant stakeholders. Rules should concern access to and management of public goods and natural resources. At the same time, regulatory obstacles can increase costs and create disincentives to compliance. It is also important to attempt to coordinate various agencies and departments concerned with different aspects of legal regulation. In this regard, methods of integrated and ecosystem protection can be especially useful. Finally, a strong judiciary not only can enforce the law, but it can ensure access to justice for communities and individuals seeking to protect their environmental rights, powers, and responsibilities.

4. National Enforcement

Treaties and other agreements call on states to take appropriate action in domestic legal systems to enforce the laws they enact pursuant to their international obligations. UNCLOS, for example, requires states parties to enforce their laws and regulations and take the other measures necessary to implement applicable international rules and standards. Arts. 213–220. In particular, flag states of ships violating international norms are to take enforcement actions, including conducting an immediate investigation and, where appropriate, instituting proceedings. Penalties must be adequately severe to discourage violations wherever they occur. Art. 217(8).

National remedies for transboundary environmental harm can include administrative remedies, civil actions, and criminal prosecution of persons who violate norms and standards of environmental law. Some treaty obligations specify particular national measures, such as a civil liability regime to hold liable the polluter or “the operator or owner of a facility.”

Convention on the Marine Environment of the South-East Pacific (Nov. 20, 1981), Art. 11; Nuclear Liability Convention (July 29, 1969), Art. II; Oil Pollution Civil Liability Convention (Nov. 29, 1969), Art. III. If no remedies are available or the remedies provided are inadequate, the case may become an interstate dispute engaging state responsibility towards other states.

The range of sanctions may include fines, confiscation of machinery and tools, closure of the installation, prohibitions on exercise of a profession or activity, or depriving a company or individual of the right of public competition. The obligation to restore the environment can be undertaken by the state and charged to the company if the latter fails to carry out its duty. Other sanctions may include a denial of government contracts or black-listing of harmful products. Lending institutions may refuse loans or other benefits to projects failing to meet environmental standards.

a. Civil Liability

Despite efforts to protect the environment, human activities and accidents give rise to environmental damage. In order to deter harmful acts and remedy damage as fully as possible, legal consequences attach to those acts that cause injury. International agreements and domestic law may refer liability issues for administrative sanctions, judicial settlement between the actor and the injured parties, or may provide for both interstate and private actions. The increasingly accepted solution is to transfer the question from the interstate level to the interpersonal level, that is from public to private international law where the polluter and victim are brought directly before the competent domestic authorities. A transnational element is present in all these cases, creating potential jurisdictional problems. It is not surprising, therefore, that states have sought to overcome the difficulties by prior agreement, concluding treaties, or adopting other international texts to resolve at least some of the problems.

Civil liability refers to the liability of any legal or natural person under rules of national law adopted pursuant to international treaty obligations that establish harmonized minimum national standards. Current treaties on civil liability number about one dozen, nearly all of them concerned with a single hazardous activity (e.g., nuclear energy or oil transport). Several conventions address vessel-source marine pollution or nuclear damage, while pollution from offshore oil and gas exploitation, carriage of dangerous goods by various means of transport, and transboundary movements of hazardous wastes are each regulated by a single treaty. Recent regional treaties in Europe apply more generally to industrial operations. Civil liability agreements generally specify the scope of activities or substances and the harm covered, channel liability, establish a standard of care and exceptions, set limitations on the amount of liability, and provide for enforcement of judgments. In addition, most include a provision for mandatory insurance or other financial guarantees.

Three nuclear liability treaties adopted in the 1960s aim partly to protect potential victims and partly to insulate nuclear industry from devastating claims. The 1960 Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention) was concluded in the context of OECD. It was intended to provide unified rules for adequate and equitable compensation while still supporting the development of nuclear energy. The Paris Convention has not been widely ratified, nor have other agreements in this field. There are no known transnational claims brought to date based on the Paris Convention, although some national claims have been based on legislation implementing the Paris Convention. The Paris Convention was enhanced with a Supplementary Convention (Brussels, 1963). The Supplementary Convention allows compensation beyond the liability limits of the Paris Convention. All claims must be brought in the state where the incident occurred, if there is one, and, if not, then the territory of the installation or the operator. Claims must normally be brought within ten years of the date of the incident, and awards are enforceable in any state party. Eleven states are parties to the supplementary convention. Protocols amending the Paris Convention and the Brussels Supplementary Convention were adopted on February 12, 2004, broadening the concept of nuclear damage and the geographic scope of the Convention. However, environmental damage on the high seas or deep seabed remains excluded.

The Paris Convention became linked to a 1963 Vienna Convention on Civil Liability for Nuclear Damage by a Joint Protocol adopted in 1988 and by a 1997 Protocol of Amendment. The 1997 Amended Vienna Convention provides that it in principle applies to nuclear damage wherever suffered, with limited exclusions. These conventions take the same approach to liability:

- Liability is channeled exclusively to the operators of the nuclear installations;
- Liability of the operator is strict, i.e., the operator is held liable irrespective of fault;
- The amount of liability is limited, although the limits may be raised or removed if fault is shown;
- Liability is limited in time;
- The operator must maintain insurance or other financial security for an amount corresponding to his liability; if such security is insufficient, the installation state is obliged to make up the difference up to the limit of the operator's liability;
- Jurisdiction over actions lies exclusively with the courts of the contracting party in whose territory the nuclear incident occurred;
- A guarantee of non-discrimination among victims on the grounds of nationality, domicile, or residence is provided.

In 1988, as a result of efforts by the IAEA and OECD, a new Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention combined them into one expanded liability regime. Parties to the Joint Protocol are treated as though they were parties to both Conventions, and a choice of law rule determines which of the two Conventions should apply to the exclusion of the other in respect of the same incident.

The 1997 Protocol set the possible limit of the operator's liability for a single nuclear incident at not less than 300 million special drawing rights (equivalent to U.S. \$400 million). Two instruments were in fact signed: the Protocol to Amend the Vienna Convention, 36 ILM 1462 (1997) and a Convention on Supplementary Compensation for Nuclear Damage, 36 ILM 1473 (1997). The Amended Paris Convention changed the unit of account to the euro and more than doubled the minimum amount to at least 700 million euro. The 1997 Protocol also redefined nuclear damage to include the concept of environmental damage and preventive measures, extended the geographical scope of the Vienna Convention, and extended the period during which claims may be brought for loss of life and personal injury. It also provides for jurisdiction of coastal states over actions incurring nuclear damage during maritime transport. In addition, a 1971 Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material provided for shipowner liability if the shipowner committed or omitted an act with intent to cause damage.

Even more than nuclear operations, environmental injury caused by marine oil pollution is regulated by an entire system based on the 1969 International Convention on Civil Liability for Oil Pollution as modified in 1971, 1976, 1984, and 1992 together with the 1971 Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, also modified by protocols, the latest being adopted in 2003. IMO Doc. 92 FUNA/A.8/4. The 1969 Convention established the liability of the owner of a ship for pollution damage caused by oil escaping from the ship as a result of an incident on the territory of a party. The owner of the ship is not responsible if he can prove that the damage resulted from an act of war, hostilities, civil war, insurrection, or a natural phenomenon of an exceptional, inevitable, and irresistible character. The same is true if the damage resulted from an act or omission of a third party done with intent to cause damage or resulted from the negligence or other wrongful act of any government or other authority responsible for the maintenance of lights or other navigational aids. Other marine liability conventions include the 1976 International Convention on Civil Liability for Oil Pollution Damage Resulting from the Exploration for or Exploitation of Submarine Mineral Resources (Dec. 17, 1976), the 1996 Convention on Carriage of Hazardous and Noxious Substances (HNS Convention, May 3, 1996), and the 2001 International Convention on Civil Liability for Bunker Oil Pollution Damage (Mar. 23, 2001), IMO Doc. LEG/CONF.12/DC/1.

The Oil Pollution Convention defines pollution as “loss or damage caused outside the ship carrying oil by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, and includes the cost of preventive measures and further loss or damage caused by preventive measures.” While the 1969 Convention applied to incidents wherever occurring, Art. 3 of the 1992 Protocol specifies that the Convention covers only damage suffered in the territory, the territorial sea, or the EEZ of a contracting state. The Convention also applies to preventive measures, wherever taken, to prevent or minimize such damage, including environmental damage; however, compensation for impairment of the environment other than loss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken. The owner may limit liability except in case of actual fault and must maintain insurance or other financial security to cover its liability.

Strict liability for maritime pollution was extended to other hazardous substances in 1996 with the adoption of the HNS Convention. The treaty covers claims for damage arising from the carriage of such substances at sea, i.e., that period during which the substances are on the ship or ship’s equipment. Art. 1(6) of the HNS Convention broadly defines damage to include, in addition to loss of life or personal injury or the loss of or damage to property, loss or damage by contamination of the environment caused by hazardous and noxious substances, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to the costs of reasonable measures of reinstatement actually undertaken or to be undertaken, and the costs of preventive measures and further loss or damage caused by preventive measures. A second tier of compensation applies when a shipowner is not liable, because the incident falls within the treaty’s exceptions or the owner had no reason to know of the nature of the substances being transported, or where the claim exceeds the liability limits. A fund is created, financed by levies on the importation of HNS cargoes.

The marine pollution system balances strict liability with limits on liability. The Protocol to amend the Convention on Limitation of Liability for Maritime Claims (May 2, 1996), Art. 2(2), established a ceiling defined in reference to IMF special withdrawal rights. The Protocol differentiates between claims for loss of life or personal injury and property losses, with limits that increase with the tonnage of the involved ship. In contrast to the treaty system, some states, notably the United States, have enacted national legislation with much higher limits of liability, including some contexts in which liability is unlimited. See Oil Pollution Act of 1990, Pub. L. No. 101-380, enacted following the *Exxon Valdez* disaster of 1989.

A claim of compensation for pollution damage may be brought directly against the insurer or other persons providing financial security for the owner’s liability for pollution damage. In order to benefit from the limi-

tation on liability, the owner must deposit the sum representing the limit of his liability with the court or other authority with jurisdiction. If liability is found, the fund is then distributed among the claimants in proportion to their established claims. Arts. 5(3) and 5(4). The owner of a ship registered in a contracting state and carrying more than 2,000 tons of oil in bulk as cargo must maintain insurance or other financial guarantee of compensation in case of liability for pollution damage. An insurance or guarantee certificate must be issued to each ship by the appropriate national authority, and contracting states are obliged to prevent a ship from trading unless the appropriate certificate has been issued. Each state must recognize the certificates issued by other contracting states.

The 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, as modified, aims to assure payment of compensation for pollution damage to the extent that protection afforded by the Liability Convention proves insufficient. The Fund is required to pay compensation to any person suffering pollution damage if the person is unable to obtain full and adequate compensation for the damage under the terms of the Liability Convention, either because no liability arises under the treaty, because the owner is financially incapable of payment, or because the damage exceeds the owner's liability under the Convention. However, the total amount of damages that the Fund will pay is also limited, to 135 million special drawing rights. This ceiling can be raised to 200 million for certain polluting accidents. Art. 4(4)(c). Contributions to the Fund are made by any person who has received total quantities of oil in excess of 150,000 tons during the prior calendar year. Art. 10.

The system has been active. Between 1971 and 2000, the Fund paid out nearly 300 million British pounds sterling with respect to 102 incidents. See International Oil Pollution Compensation Fund, Annual Report for 2000, 37–40. The system also continues to evolve. As a result of the marine disasters concerning the *Nakhodka* in 1997 and the *Erika* in 1999, the 2004 Protocol established a new international body, the International Oil Pollution Compensation Supplementary Fund, and created an optional third tier above those provided by the Civil Liability Convention and the Fund Convention. The Supplementary Fund, to be financed by oil receivers, will increase the aggregate available amount to 750 million special drawing rights for any one incident.

The 2001 International Convention on Civil Liability for Bunker Oil Pollution Damage addressed vessels responsible for the majority of oil spills. In contrast to earlier conventions dealing with damage caused by the cargo of relatively small and well-defined categories of vessels, the Bunker Convention potentially applies to all ships, defined as “any seagoing vessel and seaborne craft whatsoever.” Bunker oil means “any hydrocarbon mineral oil, including lubricating oil, used or intended to be used for the operation or propulsion of the ship, and any residues of such oil.”

The definition of “pollution damage” is identical to that of the 1992 Convention on Civil Liability. It is also subject to the same limitation in that it does not cover damage to the environment in itself but only clean-up costs and the loss of profit suffered by victims, such as fishermen and local industries dependant on ocean resources and the tourist trade. Actions for compensation may only be brought in the courts of the states where damage was suffered. Ships must carry certificates attesting to their financial security, and claims for compensation may be made directly against the insurer or other provider of financial security.

Unlike other treaties, the Bunker Oil Convention does not channel liability to a single person but defines ship owner to include others who have joint and several liability. However, only the registered owner of a ship over 1,000 gross tonnage is required to provide financial security. The regulation of mutual liability is left to national law. Art. 6 provides that the ship owner may limit liability “under any applicable national or international regime,” such as the 1976 Convention on Limitation of Liability for Maritime Claims. Under this Convention, the limits of liability are on a sliding scale depending on the size of the ship. A 1996 protocol, not in force in 2006, will raise the limits. In any case, the reference to national and international law means a lack of uniformity in liability limits for oil spills from non-tanker vessels. While it was proposed to exclude from liability any person taking reasonable measures to prevent or minimize the effects of oil pollution, no agreement was reached to include such a provision. Instead, the Conference recommended legal provisions for such persons in domestic laws. See IMO Resolution on the Protection of Persons Taking Measures to Prevent or Minimize the Effects of Oil Pollution, IMO/LEG/CONF.12/18.

For land-based activities, a Protocol on Liability and Compensation for Damage resulting from Transboundary Movements of Hazardous Wastes and their Disposal (Basel, Dec. 10, 1999) has further developed the regime of civil liability for environmental damage. Its purpose is to provide a comprehensive regime for liability and for adequate and prompt compensation for damage resulting from transboundary waste movements, including illegal traffic. It defines damage broadly to include loss of income directly deriving from an economic interest in any use of the environment, when that loss is incurred as a result of impairment of the environment. Compensation extends to the cost of measures of reinstatement, limited to the costs of measures actually taken or to be undertaken and the costs of preventive measures, including any loss or damage caused by such measures. Preventive measures are defined as any reasonable measures taken by any person in response to an incident to prevent, minimize, or mitigate loss or damage, or to affect environmental clean-up. The Protocol applies to damage due to an incident occurring during a transboundary movement of hazardous wastes and other wastes and their disposal, including illegal traffic, in particular in relation to movements destined for disposal

operations specified in Annex IV of the 1989 Basel Convention (Art. 3). The Basel Protocol imposes strict liability on, first, the person who provides notification of a proposed transboundary movement according to Art. 6 of the Basel Convention, and, thereafter, the disposer of the wastes. Liability for damage is subject to financial limits specified in Art. 12(1) and Annex B to the Protocol. During the ten-year period of liability, those potentially liable shall establish and maintain insurance or other financial guarantees. Liability limits are removed if the responsible person causes or contributes to causing damage by failure to comply with the provisions implementing the Basel Convention, or due to wrongful intentional, reckless or negligent acts or omissions.

The Protocol imposes upon the contracting parties obligations to adopt the legislative, regulatory, and administrative measures necessary to implement the Protocol and to inform the Secretariat of the Protocol of the measures it has taken. The Protocol does not affect the rights and obligations of the contracting parties under the rules of general international law with respect to state responsibility. The competent jurisdictions are the courts of the state where the damage was suffered or the incident occurred or the defendant has his habitual residence or has his principal place of business. All matters of substance or procedure regarding claims before the competent court shall be governed by the law of that court. Judgments shall be mutually recognized and enforced.

A regional model for comprehensive civil liability is the Convention on Civil Liability for Damages Resulting from the Exercise of Activities Dangerous for the Environment (Lugano). It establishes general standards for indemnification of those injured by hazardous activities and products within the European states parties. The Convention broadly imposes responsibility on all persons and companies and all state or non-state agencies exercising control over dangerous activities, irrespective of the place of the harm. However, if the damage occurs in a non-contracting state, the Convention permits reservations to be filed demanding reciprocity of remedies.

The Convention applies to dangerous activities and substances, including living modified organisms. The quality of dangerousness is largely based upon assessment of the risk of harm to man, the environment, or property. Nuclear damage is excluded if the incident is regulated by the Paris Convention on Civil Liability of 1960 or by the Vienna Convention of 1963 with its amendments or by national legislation at least as favorable to the plaintiffs as the Conventions. Workplace accidents covered by social security and automobile accidents in workplaces inaccessible to the public also are excluded.

In addition to compensation for death, bodily harm, and injury to property other than that found on the site or within the installation where the dangerous activity has taken place, recovery can be had for environmental harm, limited to the costs of reasonable measures taken to restore or

rehabilitate the environment to its prior state. Environment is broadly defined to include biotic and abiotic natural resources, such as air, water, soil, fauna, and flora, the interaction between them, cultural property, and characteristic aspects of the countryside. Recovery is also possible for the costs of mitigating measures, and any losses or damage caused by such measures after an incident or event. The maximum amount of liability may be fixed by local law, which should also insist upon adequate insurance coverage taking into account the risks associated with the activity.

Under the Lugano Convention, anyone who is in control of a dangerous activity is responsible for damages caused by that activity. States parties may reserve to the basic principle of liability, to the extent of allowing the defendant to escape liability if the defendant can show that the state of scientific and technical knowledge at the moment of the incident was insufficient to indicate the dangerous properties of the substance or the organism. The problem of multiple or long-term sources is solved by imposing joint responsibility and by placing the burden of proof on the various persons who were in control of the activity or activities to prove they were not responsible. In cases where the activity has ceased when the damage occurs, the last person in control will be liable unless he can show that the causative event took place before he was in control.

Liability is not imposed if damage occurs as a result of armed conflict, a natural disaster, an intentional act of a third party, a state command, "pollution of a level acceptable having regard to the relevant local circumstances," or if the activity was taken for the benefit of the person damaged, to the extent it was reasonable for the latter to be exposed to the risks of the dangerous activity, or if the injured party was at fault.

From the perspective of the plaintiff, there are several favorable provisions. Art. 10 provides that in examining the proof of causality, a judge should take into account the probable risk of damage inherent in the dangerous activity in question. Art. 20 permits some forum shopping, allowing the action to be filed either in the courts of a state party where the damage occurred, where the dangerous activity took place, or where the defendant has its permanent residence. Moreover, the statute of limitations is rather long. According to Art. 18, actions should be brought within five years of the date on which the plaintiff knew or reasonably should have known of the damage and of the identity of the person in control. No action may be brought more than 30 years after the causative event or the last in a series of causative events. For waste disposal sites, the final date is 30 years from the closure of the site.

Injunctive relief may be sought by environmental associations in the courts where the dangerous activity takes place, on conditions set by internal law. States may declare at signature, ratification, or accession that this possibility will be open to non-governmental organizations based in other states parties. Environmental groups may demand prohibition of any illegal dangerous activity threatening serious environmental harm, as well as

injunctions against the person in control of dangerous activity, in order to require preventive or remedial actions be taken. Where remedial action is sought, the courts of the state where the action should be taken also have jurisdiction over the case. Public authorities have the right to intervene when environmental groups bring actions. Art. 19 is explicitly subject to reservations.

All judgments rendered by a tribunal with jurisdiction according to the Convention are to be recognized in other states parties unless they are contrary to public order, the defendant was not properly notified of the action in time to prepare a defense, or if the decision is irreconcilable with a decision rendered between the same parties (*res judicata*).

Another regional agreement, the Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters was formally adopted and signed by 22 countries at the Ministerial Conference "Environment for Europe" in Kiev, Ukraine, on May 21, 2003. It is a Joint Protocol to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents.

The Protocol gives individuals affected by the transboundary impact of industrial accidents on international watercourses a legal claim for adequate and prompt compensation. Companies will be liable for accidents at industrial installations, including tailing dams, as well as during transport via pipelines. Physical damage, damage to property, loss of income, the cost of reinstatement, and response measures are covered by the Protocol. The Protocol sets financial limits of liability depending on the risk of the activity, i.e., the quantities of the hazardous substances that are or may be present and their toxicity or the risk they pose to the environment. To cover this liability, companies will have to establish financial securities, such as insurance or other guarantees. The Protocol establishes a principle of non-discrimination between transboundary victims and victims from the country where the accident occurred.

Finally, the EU adopted Directive 2004/35/EC (Apr. 21, 2004) on environmental liability with regard to the prevention and remedying of environmental damage. Damage means a measurable adverse change in a natural resource or measurable impairment of a natural resource service that may occur directly or indirectly. "Environmental damage" means damage to protected species and natural habitats that has significant adverse effects, which result from an act by an operator that was expressly authorized by the relevant authorities; water damage means adversely affecting the ecological chemical and/or quantitative status of the waters concerned; land contamination means creating a significant risk to human health as a result of direct introduction, in, on, or under land, of substances, preparations, organisms, or micro-organisms. The Directive does not cover environmental damage caused by an act of armed conflict, hostilities, civil war,

or insurrection, nor natural phenomenon of exceptional, inevitable, and irresistible character.

The operator bears the costs of the preventive and remedial action taken pursuant to the Directive. The operator is defined as any natural or legal, public or private person who operates or controls the occupational activity or to whom decisive economic power over the technical functioning of such an activity has been delegated. When environmental damage occurs, the operator must, without delay, inform the competent authority of all relevant aspects of the situation and take all practicable steps to immediately control, contain, remove, or otherwise manage the relevant contaminants and/or any damage factors in order to limit or to prevent further environmental damage and adverse effects on human health or further impairment of services. Operators have to identify potential remedial measures and submit them to the competent authority for its approval. The member states may allow the operator not to bear the cost of the remedial action where the operator demonstrates no fault or negligence or that the damage was authorized or resulted from compliance with a compulsory order or instruction emanating from a public authority. Natural or legal persons affected or likely to be affected by environmental damage or having a sufficient interest in environmental decisionmaking relating to the damage may request that remedial action be taken.

In sum, several common traits are found in the liability agreements:

1. Identification of the polluter is assured through a presumption that channels responsibility. Thus, in case of damage, the responsibility automatically is imputed to the owner or operator.
2. The system of liability is settled by imposing strict liability for damage but specifying a limited set of excuses.
3. Jurisdictional competence is determined by designating the proper forum, in some cases that of the plaintiff, in other cases that of the polluter or in permitting the victim the free choice of tribunal.
4. Time limits for filing claims are imposed.
5. Liability limits are coupled with mandatory insurance requirements.
6. The execution of judgments are assured.

It must be noted that some of the 11 major liability treaties are not in force, because many states oppose the limits on liability that these agreements contain. The Lugano Convention had not been ratified by any state as of October 2006. The HNS Convention has only eight parties, the Bunker Oil Convention has 11 ratifications, and the Nuclear Carriage Convention has 17 parties. The 1992 Amended Convention on Civil Liability for Oil Pollution, the most widely accepted Convention, has 114 parties, followed by the 1992 Amended Fund Agreement, which has 98 adherents. The fact of holdout states in turn discourages others from accepting what becomes an unequal burden-sharing.

Limited liability originated in maritime law, in recognition of the value of maritime transport and the hazards of shipping, but some see it today as undermining the polluter pays principle, because it is an unwarranted subsidy at the expense of other interests. Those favoring limited liability respond that unlimited damage awards could drive responsible shipowners out of business.¹ It is also argued that unlimited liability will make maritime transport uninsurable. In fact, liability limits have been set in large part according to insurance industry indications, rather than degree of risk and needs of victims. The problems are political and practical rather than principled.

In civil liability, as in state responsibility, the fundamental problems are to establish causation, identify the polluter, and prove damage. To these difficulties are added problems of jurisdiction, choice of law, and execution of judgments.

Adjudicative jurisdiction can exist in the state where the pollution occurs or the state where the polluter is found. As a general rule, private international law favors jurisdiction in the defendant's domicile, sometimes under principles of *forum non conveniens*. Several factors support this approach: the accused is able to defend itself in local tribunals, the evidence of harmful activity is more readily available, witnesses more easily may be called, and execution of a judgment in favor of the plaintiff will be more easily enforced. Conversely, it can be argued that the victim of the pollution should have the benefit of local courts to obtain compensation, especially because evidence of damage is more readily available in plaintiff's domicile where experts can evaluate and establish the scope of injury. Moreover, the innocent victim should not have to bear the additional expenses of litigation in a foreign country. Whatever solution is taken, the basic principle applies of equality of access and equal treatment of aliens and nationals.

In U.S. federal courts and most state courts, there is a presumption in favor of plaintiff's choice of forum that the defendant must overcome by showing that the chosen forum would be unnecessarily burdensome. *Piper Aircraft Co. v. Reyno*, 454 U.S. 235, 102 S. Ct. 252, 70 L. Ed. 2d 419, at n.19. In various cases of transnational litigation, the U.S. Supreme Court has stated that a plaintiff's choice of forum should rarely be disturbed. *Piper Aircraft v. Reyno*, *id.*; *Gulf Oil v. Gilbert*, 330 U.S. 501, 67 S. Ct. 839, 91 L. Ed. 1055 (1947); *Koster v. Lumbermens Mut. Cas. Co.*, 330 U.S. 518, 67 S. Ct. 828, 91 L. Ed. 1067 (1947). See also *Macedo v. Boeing Co.*, 693 F.2d 683 (7th Cir. 1982) (reversing dismissal that would require resort to foreign forum) and *In re Union Carbide Corp. Gas Plant Disaster at Bhopal, India in December 1984*, 809 F.2d 195 (2d Cir. 1987) (upholding dismissal on *forum non conveniens* grounds).

¹ See Robin R. Churchill, *Facilitating (Transnational) Civil Liability Litigation for Environmental Damage by Means of Treaties: Problems and Progress*, 12 Y.B. INT'L ENVTL. L. 1, 35–36 (2001).

Choice of law is determined by the court with jurisdiction. Generally, tribunals apply local law, but public policy concerns and the principle of non-discrimination may affect the choice, or treaty law may dictate the appropriate law to apply. The latter rule requires that in no case may the plaintiff's complaint be judged according to rules less favorable than those that would be used to judge the matter in the state where the activities took place.

Providing compensation for environmental harm requires a consideration of the amount of damage that has occurred. The concept of harm to the environment is often viewed as a property concept, where economic value is placed on the lost or damaged object. This may include market value, loss of income, and damage to moral, aesthetic, and scientific interests. The economic approach poses problems for protection of species of wild fauna and flora that are not exploited and thus have no market value, as well as for ecosystems or landscapes whose economic value cannot be assessed. Determining the economic value of the intangible aspects of the environment, such as biological diversity, balanced ecosystems, and environmental services, is difficult. The situation is similar for areas that are under common ownership, and even more for those areas that are for common use but not capable of ownership, such as the high seas and outer space. Measurement or evaluation of harm for the purpose of damage awards also involves important questions of the threshold or *de minimis* level of harm, proximity of harm, especially for long-term, long-distance, multiple-authored actions and, finally, the possible irreversibility of the harm caused. The last issue is something that is thus far largely ignored in international law, except for declaring certain serious environmental damage as a war crime. See Chapter VIII, Section D.

Increasingly, civil liability conventions are addressing damage to the environment but generally limit recovery to the costs of reasonable measures of reinstatement and the costs of preventive measures. The UNECE Task Force on Responsibility and Liability regarding Transboundary Water Pollution has proposed a definition of damage that includes "detrimental changes in ecosystems." For this, there may be awarded the equivalent costs of reasonable measures of reinstatement actually undertaken and further damages exceeding those provided for under the first measure, i.e., there may be substitute damages where reinstatement is impossible because of the irremediable nature of the harm.

Execution of foreign judgments in tort matters is not guaranteed absent treaty protection, although the state of the polluter may consent to respect the judgment on the basis of comity. Uncertainty on this question may induce plaintiffs to choose the courts of the state where the polluter is found rather than their own national courts.

Given the myriad uncertainties and risks of litigation, a plaintiff could become involved in a legal steepchase where one hurdle after another must be overcome in order to receive compensation for environmental harm.

b. Penal Law

The function of penal law is to protect the most important values of society, by creating and enforcing penalties, including those involving deprivation of liberty for those who contravene the law. Increasingly, national law is imposing criminal liability on those who pollute and perform other acts damaging to the environment. In most states, a company, its directors, and other senior managers may be held responsible. Normally, a company will be guilty of an offense if the offense-relevant conduct involves instructions or other acts of a “directing mind” of the company. Penal sanctions can range from fines for petty offenses to imprisonment for more serious crimes. Several existing international agreements call for penalties adequate to deter violations. States also should criminalize environmental offenses when committed with gross negligence.

There are elements of environmental offenses that distinguish them from other areas of criminal law. Most criminal law is based upon a direct individual relation between a perpetrator and a victim who has been harmed. In contrast, environmental protection can involve perpetrators and victims who can only be identified statistically, because harm results from long-term multiple causes. Two responses are possible. The first is to assume the existence of danger or harm to public interests that are traditionally protected by penal law, such as life, health, and property. The other is to develop new offenses against the environment, protecting independent natural elements without requiring an element of provable harm to specific victims. Both approaches can be found in existing provisions of penal law.

Effective enforcement of criminal law may require international cooperation, particularly when the offenses concern illicit trade. Examples of agreements for enforcement cooperation include Protocol on Wildlife Conservation and Law Enforcement (Maputo, Aug. 13, 1999) adopted by the Southern African Development Community (SADC), which aims to ensure regional conservation and sustainable use of wildlife and the enforcement of wildlife conservation laws. As all the contracting states are members of the International Criminal Police Organization (Interpol), enforcement measures include coordinating the designated Interpol National Central Bureaus. The Bureaus exchange information concerning the illegal taking of, and trade in, wildlife and wildlife products, coordinate efforts to apprehend illegal traders and takers, and to recover and dispose of illegal wildlife products. The Bureaus may request from each other any assistance or information that may be required to locate, apprehend, or extradite an individual charged with violating the wildlife laws of a state party. States parties are to provide all available data on the location and movement of illegal takers and traders and the location of routes for illegal transfrontier trafficking in wildlife and wildlife products.

In conclusion, principles of international environmental law and more precise obligations found in international agreements give guidance to states in their drafting of national and local environmental laws and procedures. The array of techniques and procedures discussed serves to direct the implementation of international norms and standards; the actual techniques and procedures adopted in each legal system will reflect local priorities and conditions, as well as international law.

B. INTERSTATE MEASURES

1. Trade Restrictions

Import/export restrictions, both temporary suspensions and permanent trade bans, are commonly utilized for the protection of endangered wild flora and fauna. The 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), for example, uses trade restrictions as a means of protecting threatened and endangered species. CITES lists in a first appendix all species threatened with extinction that are or may be affected by trade. Trade in these species is virtually prohibited, requiring prior grant and presentation of export and import permits issued under stringent conditions for limited non-commercial purposes. Two additional appendices list those species that may become threatened with extinction unless trade is regulated. Trade regulations also prohibit or regulate ozone-depleting substances and transport and dumping of toxic and dangerous wastes.

The Montreal Protocol on Substances that Deplete the Ozone Layer was the first global environmental agreement containing trade restrictions on industrial products as a subsidiary but necessary measure to ensure effectiveness of the treaty. The Protocol addresses trade as part of the effort to ensure that non-parties do not benefit from the advantages of the Protocol without accepting its obligations. Its provisions also limit the possibility that parties can circumvent their obligations by ensuring that the production of controlled substances cannot be transferred to the territory of non-parties.

The North American Free Trade Agreement (NAFTA) between Canada, Mexico, and the United States mentions in its preamble the will of the three contracting governments to promote sustainable development and to strengthen the development and enforcement of environmental laws and regulations. Chapter 11 regulates trade and investment. Art. 104 and Annex 104.1 state that in the event of any inconsistency between the Agreement and the trade-restrictions set out in CITES, the Montreal Protocol, the Basel Convention on Wastes, a 1986 agreement between Canada and the United States on hazardous wastes, and a 1983 agreement between Mexico and the United States for the Protection and Improvement of the Environment in the Border Area, the obligations of

the environmental agreements prevail to the extent of the inconsistency. The same provision requires, however, that the parties implementing these agreements adopt the implementing alternative that is the least inconsistent with other provisions of NAFTA Art. 104.

Like NAFTA, the Central European Free Trade Agreement (CEFTA)² provides that its implementation shall not preclude prohibitions or restrictions on imports, exports, or goods in transit justified by the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption (Art. 18). On the compatibility of these measures with the GATT/WTO trading regime, see Chapter VIII, Section C.

Agenda 21, based almost entirely on earlier work at UNCTAD, calls for reversing unilateral trade barriers that restrict access to markets, as well as for reducing external debt. It insists on improved access for exports of developing countries and an open, non-discriminatory and equitable multilateral trading system. It provides that, in particular, states should avoid use of trade restrictions or distortions to offset differences in cost arising from differences in environmental standards and regulations, and should ensure that environmental regulations or standards do not constitute a means of arbitrary or unjustifiable discrimination or disguised restriction on trade. Even when based upon the required international consensus, trade measures necessary to render effective environmental objectives should be non-discriminatory and the least restrictive necessary to achieve the objectives. Transparency and notification are required, as well as public input in the formation, negotiation, and implementation of trade policies. Although setting out general guidelines, the difficult issues involved in using trade restrictions for environmental protection were not settled at Rio nor have they been resolved by later developments.

2. Prior Informed Consent Procedures

Prior informed consent (PIC) is an increasingly mandated mechanism utilized in advance of transnational activities in order to avoid potential conflict and reduce the risks of environmental or social harm. Prior informed consent requires obtaining and disseminating the decisions of importing countries on whether they wish to receive shipments of restricted or banned products after they have been fully informed about the hazards posed by the products. In most instances, the products to which the procedure applies are those that pose serious or irreversible risks to health or the environment. The procedure also applies, however, to mediate access to a state's biological resources, in order to obtain disclosure of potential

² Czech Republic, Hungary, Poland, and Slovak Republic, Krakow, Dec. 21, 1992, 34 ILM 3 (1995).

benefits arising from the access. The importance of PIC was recognized as early as 1983 in General Assembly Resolution 37/137 which states:

Products that have been banned from domestic consumption and/or sale because they have been judged to endanger health and the environment should be sold abroad by companies, corporations or individuals only when a request for such products is received from an importing country or when the consumption of such products is officially permitted in the exporting country.

G.A. Res. 37/137 para. 1 (1983). In 1989 the FAO Conference introduced the principle of prior informed consent when amending the International Code of Conduct on the Distribution and Use of Pesticides. The Governing Council of UNEP also adopted it for incorporation in the London Guidelines for the Exchange of Information on Chemicals in International Trade, UNEP/GC.14/17, Annex IV. A 1992 MOU between the two organizations led to guidelines on the PIC principle. In 1994 and 1995, the two organizations agreed on the need for a legally binding instrument for the application of the PIC procedure for certain hazardous chemicals and pesticides in international trade. The Convention was adopted in Rotterdam in 1998.

UNEP's London Guidelines for the Exchange of Information on Chemicals in International Trade (1987) defined prior informed consent as

the principle that international shipment of a chemical that is banned or severely restricted in order to protect human health or the environment should not proceed without the agreement, where such agreement exists, or contrary to the decision, of the designated national authority in the importing country.

Three global environmental agreements rely on a form of prior informed consent: the Convention on Transboundary Movements of Hazardous Wastes (Basel, Mar. 22, 1989), Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam, Sept. 10, 1998), and the Biosafety Protocol (Montreal, Jan. 29, 2000) to the 1992 Convention on Biological Diversity (CBD). UNCLOS suggests a PIC procedure for scientific research within a state's exclusive economic zone, specifying that foreign vessels obtain prior consent of the EEZ state. The CBD calls for access to genetic resources on agreed terms and requires that such access be subject to the prior informed consent of the provider country of such resources. Art. 15(5).

The modalities of the PIC process, as applied to access to genetic resources, were elaborated through the Bonn Guidelines adopted by Decision VI/24 of the sixth Conference of the Parties in April 2002. The Guidelines set forth basic principles of a prior informed consent system

that should include: (1) legal certainty and clarity; (2) accessibility, in that access to genetic resources should be facilitated at minimum cost; (3) transparency: restrictions on access to genetic resources should be transparent, based on legal grounds, and not run counter to the objectives of the Convention; and (4) consent of the relevant competent national authority(ies) in the provider country and the consent of relevant stakeholders, such as indigenous and local communities, should be obtained as appropriate and according to domestic law.

The 1998 Rotterdam Convention broadly requires prior informed consent for any product or substance subject to final regulatory action. It thus includes chemicals refused permission to enter the market, as well as those that have been withdrawn or banned. All information on such substances is channeled through the Secretariat (UNEP/FAO) to a subsidiary body, the Chemicals Review Committee. The final listing decision rests with the Conference of the Parties, which takes such decisions by consensus. Unlike the Basel and Cartagena Agreements, the Rotterdam Convention does not require shipments made without consent to be taken back by the exporting state, but the Cartagena Agreement is unique among the treaties in requiring a risk assessment as part of the process.

3. Aid and Financial Conditionality

Severe foreign debt and dependency on a narrow range of exports to earn the foreign exchange to meet their debt obligations make developing countries particularly susceptible to aid conditionalities. The debt of the 40 poorest countries is, on average, more than four times their annual export earnings and in excess of their annual gross national products. Thirty-three African countries have unsustainable debt levels. One-half of export earnings of Africa goes to service debt, and 30 African countries have had to reschedule their debts. The declining exchange rate of developing countries also has an inflationary impact making imports more expensive and often reducing investment and output.

Structural adjustment loans (SALs) became popular after 1980 when the first such loan was made by the World Bank. More than 50 countries received such loans in the 1980s, and they became a major part of the Bank's development assistance program during this period. They allowed the Bank to play an active role, in theory, in helping developing countries overcome structural weaknesses in their programs for rapid development. SALs often introduced severe conditionality in clauses that allowed the lender to directly influence policy and institutions in the debtor states. An ambitious program of debt relief was instituted in 1997 by the World Bank and the IMF. The Heavily Indebted Poor Countries Initiative combined substantial debt relief and policy reform to allow greater focus on poverty reduction and economic growth. It is used specifically in cases where traditional debt relief mechanisms are inadequate.

The EC also began linking environmental protection and economic assistance in the 1980s. It entered into a series of agreements with some 70 African, Caribbean, and Pacific states (ACP). They signed the Lome IV Agreement on December 15, 1989, which included a chapter, Title I, specifically devoted to protection of the environment and conservation of natural resources deemed to be fundamental objectives of the Agreement. Art. 33, Lome IV. There were some objections to efforts to impose environmental conditionality, and the Lome Agreement was revised November 4, 1995, in Mauritius. Later, the EC-ACP states replaced Lome IV by an Agreement on Partnership between ACP and EU states, signed in Cotonou on June 23, 2000. The Agreement calls on the states to take into account questions related to the transport and disposal of hazardous waste (Art. 32.1.d), but otherwise does not discuss environmental matters.

The OECD also adopted measures to link environmental protection to development assistance. It recommended an environmental checklist for development assistance, calling on member countries to ensure that bilateral and multilateral development assistance takes into account environmental considerations in the identification, planning, implementation, and evaluation of those development projects that are proposed for funding. OECD Doc. C(89)2(Final), Mar. 2, 1989, 28 ILM 1314 (1989).

On a unilateral level, in U.S. domestic law, the so-called "Pelosi Amendment" seeks to enhance environmental protection abroad by requiring the U.S. Executive Director for each multilateral development bank (including the World Bank), to refrain from voting in favor of any proposed action by the bank that would have a significant effect on the human environment, unless an environmental assessment has been prepared and circulated to the bank and other interested organizations at least 120 days before the date of the vote. 22 U.S.C. § 262m-7. The assessment analyzing the environmental impacts of the proposed action and its alternatives can be prepared by the borrowing country or the lending institution and must be made available to the board of directors of the institution. Absent compelling circumstances, the assessment must also be made available not only to the bank, but to affected groups and local non-governmental organizations. In effect, the Pelosi Amendment extends the National Environmental Policy Act's (Pub. L. No. 91-190, Jan. 1, 1970) broad coverage to multilateral development bank operations.

In a related development, the U.S. Export-Import Bank, a 60-year-old independent agency that finances overseas sales of U.S. goods and services, has incorporated environmental considerations into its lending policies. The Bank guarantees loans for U.S. exporters and repayment of loans by foreign purchasers of U.S. goods and services and often provides credit for risks commercial banks will not accept. In 1995, as required by statute, the Bank adopted a detailed set of Environmental Guidelines to consider the environmental consequences of proposed transactions prior to approving export finance. 12 U.S.C. § 635i-5; Export-Import Bank of the United

States Environmental Procedures and Guidelines, effective Feb. 1, 1995. Applicants are required to submit for evaluation information about the project's environmental impacts. The Guidelines establish standards for air quality, water quality, waste management, and noise for projects in specific industry sectors (e.g., mining, pulp and paper, energy). Certain transactions that do not raise significant environmental issues are exempt from review procedures. Projects that do not meet all the environmental guidelines are reviewed on a case-by-case basis by the Bank's Board of Directors, taking into account mitigating effects and circumstances. Financing may be conditioned on the implementation of mitigating measures.

The U.S. Congress also directed the U.S. Overseas Investment Corporation (OPIC) to take account of the environmental effects of projects in determining whether to provide insurance, financing, or reinsurance for a development project. OPIC provides insurance for American investments in new ventures and expansions of existing enterprises, including protection against limits on repatriation of local currency, expropriation, and political violence. Congress has directed OPIC "to the maximum degree possible," consistent with its development purposes, to refuse to "insure, reinsure, guarantee or finance any investment in connection with a project which the Corporation determines will pose an unreasonable or major environmental, health, or safety hazard, or will result in the significant degradation of national parks or similar protected areas." 22 U.S.C. § 2191(n). OPIC screens all investment requests to determine whether they meet environmental standards and requires major projects to prepare an environmental impact assessment.

Non-governmental organizations introduced another form of debt linkage with environmental protection with an innovative program that allows developing countries to pay off part of their external debt by committing themselves to invest such funds in environmental protection. These "debt for nature swaps" have been undertaken by private foundations, commercial banks, and a few national government policies. In October 1990, the United States included debt-for-nature swaps in the "Enterprise for the Americas" initiative. Congress also approved conversion of debt into nature conservancy projects.

Despite generalized concern with environmental protection, developing countries continue to view such conditions as constraints on development opportunities and national sovereignty, as well as a disguised form of protectionism. Rio Principle 12 reflects these views in advocating a "supportive and open economic system" that avoids "arbitrary or unjustifiable discrimination or a disguised restriction on international trade" in the use of trade measures for environmental purposes and calling for measures to be adopted on the basis of "international consensus."

Chapter VII

The Substance of International Environmental Law

Shared resources of the earth include fresh and marine water resources, the atmosphere and stratosphere, and migratory species. All have been damaged by human activities. Soil, forests, and landscapes are also endangered, but they cannot be considered as shared resources when they are within the territory and under the sovereignty of a single state.

A. FRESHWATERS

Inland or fresh water accounts for only 2.7 percent of the earth's water, and a large proportion of this limited quantity is frozen in glacial ice caps at the two poles and on high mountains. Humanity now uses, directly or indirectly, more than half of the world's accessible water supply, and the demand for water is rising with increasing population, higher living standards, and the extension of water-utilizing industries, such as mining and metal-processing, cement production, wood processing, and irrigation-based agriculture. The global per capita availability of freshwater worldwide fell by one-third between 1950 and 1995, but the usage levels are unevenly distributed. According to the Food and Agriculture Organization, in 2000, the per capital consumption of fresh water in Angola was 28 cubic meters, much less than the U.S. per capita consumption of 1,682 cubic meters annually.

Fresh water is still abundant, but its availability varies widely. States are considered to experience chronic scarcity when water resources fall below a "benchmark" of approximately 1,000 cubic meters per person per year. Chronic shortages already exist in many areas where precipitation is low or unreliable and/or where withdrawals have significantly increased to meet national demand from irrigation, industry, or urban populations. In addition to pressure on water resources from economic development and

changes in social consumption patterns, water supply increasingly is constrained by land use changes (for example, forest clearance, which tends to increase run-off and reduce water availability) and contamination from human settlements, industry, and agriculture. See generally *THE SCARCITY OF WATER, EMERGING LEGAL AND POLITICAL RESPONSES* (E.H.P. Brans, E.J. de Haan, A. Nollkaemper & J. Rinzema eds., 1997).

Pollution and the presence of disease-causing organisms pose qualitative problems for freshwaters. Approximately 1.2 billion people in developing countries lack safe water supplies and nearly 3 billion lack access to sanitation services. The issue of access to water and sanitation proved to be a major issue at the Johannesburg World Summit on Sustainable Development held in 2002. Sewage disposal is a classic use of flowing water and has been linked to epidemics of plague and cholera. The disposal of chemicals and hazardous wastes, the use of pesticides and fertilizers, also affect water quality. Freshwater resources are threatened by deforestation as well.

Most of the waters of the earth are linked, although the legal regimes applicable to them differ widely in response to geographic, economic, social, and political factors. The uses to which waters are put (e.g., domestic, agricultural, or industrial purposes) are a function of population density, the level of economic development, and cultural traditions, and they affect the economic and environmental values of water, as well as the content of legal regulation. The complexity this brings to the topic of regulating water resources is accentuated by international boundaries. Nearly half of all land and 40 percent of the world's population are found within international river basins. Rivers may constitute the border between two countries, traverse the frontier, or even combine the two characteristics, as with the Danube, the Rhine, and the Rio Grande. An estimated 263 international river basins cover 45.3 percent of the land surface area of the earth, excluding Antarctica, with 13 river basins shared by five or more countries. International regulation thus must adapt itself to multiple situations, resulting in a variety of regulatory schemes, often influenced by factors other than environmental.

The physical unity of an integrated water network should lead naturally to addressing surface and underground water problems for an entire hydrographic basin. The laws of certain countries adopt this approach, but it is a recent development at the international level. For the most part, instruments governing boundary waters concern only the surface waters in the zone regulated by these treaties. In addition, most conventions concerning the protection of rivers traditionally have applied only to isolated rivers or even certain portions of rivers.

The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses, discussed further below at Section A.2 made an important contribution to international environmental law by defining a "watercourse" as "a system of surface waters and groundwaters consti-

tuting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.” Art. 3(a) This definition reflects the approach taken by Agenda 21, adopted at the Rio Conference in 1992. According to Chapter 18, para. 36, the complex and interconnected nature of freshwater systems demands that freshwater management be holistic, taking a “catchment” approach, and must be based on a balanced consideration of the needs of people and the environment. Agenda 21 declares that three objectives need to be pursued concurrently to integrate water quality and water resource management: the maintenance of ecosystem integrity of the drainage basin, public health protection, and human resources development for implementing water quality management. Para. 18.38.

1. Overview

Early interstate cooperation concerning rivers and lakes generally addressed utilization of a watercourse for navigation or irrigation, or concerned the management of risks, such as flooding. Environmental aspects began to be included toward the beginning of the 20th century, but cooperation generally was limited to neighboring states sharing all or part of a river or a lake. In addition, deterioration of water quality was not seen a matter of common concern, because it did not affect all riparian states in similar manner, downstream states suffering more harm than the upstream riparian.

International water law has to take into account, among other factors, the geography, meteorology, society, history, politics, and economics of each region. For almost a century, local and subregional regulations have been tailored to a specific watercourse or an area. At first, particular water pollution problems were addressed when harmful activities originated in one among neighboring countries, applying general precedents and norms of transfrontier pollution. Later, the development of international environmental law led to the adoption of global rules and principles to govern the conduct of states in respect to the conservation and harmonious utilization of natural resources shared by two or more states. Inland waters perhaps best illustrate the problems of shared natural resources that need integrated protection for their complex ecosystems.

2. General Rules

A holistic approach considers all water resources without regard to the existence of international borders. The UN International Law Commission, in its mandate to develop and codify international law, began work on the law of non-navigational uses of international watercourses in 1971. In 1990, at its 42nd session, it adopted articles devoted to the environmental protection of international waters. The UN General Assembly accepted the

articles and, based on them, adopted a Convention on the Law of the Non-Navigational Uses of International Watercourses on May 5, 1997.

The Convention mandates that watercourse states, in their respective territories, utilize an international watercourse in an equitable and reasonable manner and with a view towards obtaining optimal and sustainable utilization thereof consistent with adequate protection of the watercourse. Art. 5(1). In addition, such states have the duty to cooperate in such protection and development thereof. Art. 5(2). Art. 6 lists the factors relevant to deciding whether a use is equitable and reasonable: natural factors (geography, hydrology, climate, ecology); social and economic needs; dependent populations; existing and potential uses of the watercourse; conservation, protection, development, and economy of use of the water resources and the costs of measures taken to that effect; and the availability of alternatives of comparable value to a particular planned or existing use. In determining what is a reasonable and equitable use, all relevant factors must be considered together. No use enjoys inherent priority over other uses, but in the event of a conflict, special regard must be given to the requirements of human needs.

Art. 7 obliges states to take all appropriate measures to prevent significant harm to other watercourse states. Any state causing such harm must consult with the affected state and eliminate or mitigate such harm and, where appropriate, discuss the question of compensation.

The Convention confirms the general rules of international environmental law by requiring transmission of information about planned measures that could have a transboundary impact (Arts. 11–16), consultations and negotiation concerning such measures (Art. 17), and emergency situations (Art. 25). It also affirms the duty of non-discrimination on the basis of nationality or residence in granting access to judicial or other procedures to any person who has suffered appreciable harm as a result of an activity related to an international watercourse or is exposed to a threat thereof. Art. 32. The term “appreciable” indicates that the threshold for individual remedies is lower than that prompting the preventive and other interstate obligations, which only arise if the threatened harm is “significant” or “serious.”

The most innovative provisions are those particularly relevant for international environmental law. The Convention obliges watercourse states to protect, preserve, and manage international watercourses and their waters (Art. 1(1)) and specifically to protect and preserve watercourse ecosystems (Art. 20). Watercourse states also must prevent the introduction of alien or new species into the watercourse if the species may have detrimental effects on the ecosystem of the watercourse resulting in significant harm to other watercourse states. Art. 22. The pollution of an international watercourse is defined broadly as “any detrimental alteration in the composition or quality of the waters . . . which results directly or indirectly from human conduct.” Watercourse states shall prevent, reduce, and control

pollution, in particular by harmonizing their policies. The measures advocated include setting joint water quality objectives and criteria, establishing techniques and practices to address pollution from point and non-point sources, and establishing lists of substances whose introduction is to be prohibited, limited, investigated, or monitored. Art. 21.

Albeit the entire Convention focuses on cooperation among watercourse states, Arts. 3 and 4 promote formalized cooperation by encouraging the conclusion of watercourse agreements that further apply and adjust the provisions of the Convention. Even without concluding such an agreement, consultations shall be undertaken at the request of a watercourse state concerning the management of the watercourse, including the possible establishment of a joint management mechanism. Art. 24(1). "Management," as used in this provision, "refers, in particular, to (a) planning the sustainable development of an international watercourse and providing for the implementation of any plans adopted; and (b) otherwise promoting the rational and optimal utilization, protection and control of the watercourse." Art. 24(2).

The UN Convention now constitutes the essential basis of international law on fresh waters. As a codification convention, it generally expresses customary international law, although some elements in the Convention reflect compromises between upstream and downstream riparian interests and the progressive development of international environmental law.

The requirement of equitable utilization has inevitably given rise to a trend favoring the conclusion of joint management agreements that create institutions and procedures for allocating shared water resources, establishing priorities, and determining equitable use. In a related matter, the expansion of freshwater law to include the entire catchment area or watershed enlarges the number of states participating in such management agreements. The Danube Agreement, for example, allows participation by all states that contain more than 2,000 square kilometers of the total catchment area.

Regional bodies also have adopted general principles regarding fresh water. In the decade between 1980 and 1990, the Committee on Water Problems of the UNECE drafted a series of general texts on cooperation in the field of transboundary waters. See Res. I(42), Apr. 10, 1987, E/1987/33, E/ECE/1148, at 65; ECE Declaration of Policy on Prevention and Control of Water Pollution, Including Transboundary Pollution, Res. B(XXXV), Apr. 26, 1980, UN Doc. E/1980/28, E/ECE 1008, at 92. They start from the accepted principle that states must take measures not to cause environmental damage outside the national jurisdiction. As a consequence, the protection of transboundary waters cannot be solely national, but requires cooperation among riparian countries. Riparian states should conclude treaties, notably on matters concerning pollution, where they should jointly define water quality standards and objectives. Supervision, monitoring, and observation of water quality and pollution

should be jointly undertaken, and states should exchange facts and information on pollution. This needs the creation of efficient systems of alert in cases of serious accidental pollution and, in appropriate cases, the organization of mutual aid for emergencies. Finally, institutional arrangements are deemed necessary including the creation of commissions and mixed working groups.

Specific conventions concerning regional cooperation for the protection and the management of international rivers have been adopted in Europe (Rhine, Danube, Oder, Meuse) in the Americas (U.S.-Canada boundary waters, U.S.-Mexico boundary waters, Uruguay river), in Africa (Niger Basin, Gambia River) and in Asia (Ganges waters, Mekong river basin). Indeed, the United Nations estimates there are over 3,800 unilateral, bilateral, and multilateral declarations and conventions concerning shared water resources, including 286 treaties concerning more than 200 river basins. UNEP, World Water Development Report 2006.

B. ATMOSPHERE, STRATOSPHERE, AND CLIMATE

The cover of gases surrounding the planet conditions life, protects all living things from harmful solar radiation, and regulates the global climate. The chemical composition of the atmosphere has been quite stable for 600 million years, with four gases comprising 99.99 percent of dry air: nitrogen (78.08 percent), oxygen (20.95 percent), argon (0.93 percent) and carbon dioxide (0.03 percent). The proportion of these gases remains almost identical up to an altitude of approximately 50 miles (80 kilometers).

The introduction of pollutants into the atmosphere creates multiple effects, because the air is essentially a place of transit: gases or particles remain there temporarily and manifest many of their impacts only after returning to the soil, plants, marine waters, lakes, or rivers. Poisonous air also directly damages living creatures and objects. The three most serious known ecological catastrophes—Bhopal, India, Chernobyl, Ukraine, and the Indonesian forest fires—produced most of their victims as a result of direct contact with polluting elements in the atmosphere. Pollutants often undergo modifications in their composition once they enter the atmosphere. Finally and significantly, air pollutants move quickly and cover greater distances than do pollutants in watercourses or the marine environment. The atmosphere is in fact the planet's largest single shared resource, consisting of several large air basins.

Numerous sources emit pollution into the atmosphere, including energy-production facilities, industrial processes, waste incinerators, transportation vehicles, and even animal farms. The amount of pollutants varies from one area to another, depending on the type and concentration of human activities and on the measures taken to reduce emissions. The countries of OECD account for about half of the total annual global polluting emissions and, according to the World Resources Institute, the

United States leads in both total (25 percent) and per capita (19.4 metric tons annually) emissions of greenhouse gases. With increasingly industrialization, China's emissions significantly grew during the past decade and are expected to continue to rise. See World Resources Institute, *Historic CO₂ Emissions by Fossil Fuels*, available at <http://www.wri.org> (Sept. 2001).

Legal regulation of other environmental issues can have an impact on air pollution. Efforts to clean up water or soil, for example by incinerating wastes instead of depositing them on the ground or dumping them into the sea or into inland waters, aggravates air pollution. Similarly, the siting of industrial facilities is important, because when pollutants are emitted into the atmosphere, the amount and direction of their dispersion plays a significant role in determining the extent of damage they cause. Efforts to reduce atmospheric pollution should address the use of fuels that are rich in sulfur, lead, or other pollutants, and control combustion processes. With 60 to 70 percent of all acid rain estimated to be due to sulfur oxide emissions, with nitrous oxides responsible for the rest, reducing acid rains means reducing the sulfur content of combustion gases, either by using low-sulfur fuels or by removing sulfur before or during the combustion process.

1. Overview

Air pollution has been defined as

the introduction by man, directly or indirectly, of substances or energy into the air, resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property, and impair or interfere with amenities and other legitimate uses of the environment.

Art. 1(a), Convention on Long-Range Transboundary Air Pollution (Geneva, Nov. 13, 1979). This definition adapts the general concept of pollution, focusing on risk or harm resulting from changes in the environment.

Atmospheric pollution appears in multiple forms, some only recently understood. Domestic and international regulation has evolved as the impacts of each form of pollution have become known. Air pollution led to international disputes relatively early. From the end of the 19th century, fumes emitted by a zinc and lead smelter situated in Trail, Canada, some dozen kilometers from the U.S. border, posed the problem of transfrontier pollution and reparation for the harm it caused.

To combat deterioration in air quality, initial measures sought to disperse the pollutants through increasing the height of factory smokestacks. The "solution" created new environmental problems: emissions taken to higher atmospheric levels traveled considerable distances on air currents, causing long-range pollution damage. As a result, air pollution was no longer solely a local phenomenon concerning large cities and industrial

zones, but by the 1970s was a matter that affected non-industrial countries and agricultural areas often far from the source of the emissions. The effects were particularly felt in Scandinavian countries, even though their air quality was not considered unacceptable. The rivers and lakes of Scandinavia showed disquieting symptoms, due to the increase in sulfuric substances that were transformed into sulfuric acid. The presence of acid in freshwaters reached a point where it endangered fish, micro-decomposers, algae, and other aquatic life.

While acidification of Scandinavian lakes by sulfuric rain originating from afar was at the heart of discussions during the 1970s, by 1980 public opinion in Central and Eastern Europe and in Canada turned to the disappearance of forests due to pollution. In 1995–1997, a survey of European forests taking in 116,000 hectares (approximately 290,000 acres) in 29 countries revealed that one in every four trees was suffering from abnormal thinning of the crown, with only slight differences between conifers and broad-leaved trees. The surveys were carried out by the UN Economic Commission for Europe and the European Union. See *Forest Conditions in Europe, Results of the 1996 Crown Conditions Survey: 1997 Technical Report*, ACID NEWS Dec. 4–5, 1997, at 14–15. Multiple causes for the destruction were suggested, including successive drought years, viral diseases, and fungi; however, atmospheric pollution was still considered the primary factor, either as principal agent or as contributing to the weakening of trees, making them less resistant to the lack of water or disease.

2. International Efforts to Control Air Pollution

Although air pollution was traditionally considered as a local problem, the leading early case in international environmental law concerned trans-frontier pollution caused by fumes. See Chapter I, Section E.1. The first international regulations addressing air pollution were aimed at resolving a different problem. In 1958, the Economic Commission for Europe of the United Nations sought to facilitate international trade by establishing uniform standards for automobile equipment and parts. Several of the measures adopted aimed at creating “cleaner” exhaust by imposing engine standards concerning carbon monoxide, nitrous oxides, and unburned gasoline emissions. In 1968, the WMO established a global network to monitor chemical components related to climate change and environmental issues. Today, the Background Air Pollution Monitoring Network comprises more than 200 stations measuring the atmospheric content of a variety of chemical pollutants including carbon dioxide, sulfate, and nitrogen oxides.

The first of the few binding rules of a global nature concerning atmospheric pollution are found, perhaps unexpectedly, in UNCLOS (Dec. 10, 1982). According to Art. 212, states must adopt laws and regulations to prevent, reduce, and control pollution of the marine environment from or through the atmosphere. The laws and regulations should apply to the

states' airspace and to vessels and aircraft flying their flag or under their registry. States also must take other measures as necessary to prevent, reduce, and control such pollution. On the international level, they must endeavor to establish global and regional rules and procedures. Within the limits of their jurisdiction, they must enforce the laws and regulations they adopt. UNCLOS, Art. 222.

Most of the significant progress in air pollution control has been achieved at the regional or bilateral level, primarily within Europe. The Final Act of the Helsinki Conference on Security and Cooperation in Europe (Aug. 1, 1975) gave the UNECE the task of preparing an international treaty concerning air pollution, which became the Geneva Convention on Long-Range Transboundary Air Pollution (LRTAP). Adopted on November 13, 1979, by all European states as well as the United States and Canada, the Geneva Convention is a framework convention. It is primarily concerned with cooperation, and its character is essentially programmatic; it contains almost no precise rules. It defines long-range transboundary air pollution as "air pollution whose physical origin is situated wholly or in part within the area under the national jurisdiction of one State and which has adverse effects in the area under the jurisdiction of another State at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources." Art. 1(b).

Obviously, this definition of air pollution excludes individual responsibility of the polluter, because that person or entity cannot be identified. The general obligation of the states parties is to protect humans and the environment against air pollution, and to endeavor to limit and, as far as possible, gradually reduce and prevent it (Art. 2). The parties are to develop policies and strategies to serve as a means of combating the discharge of air pollutants, using the best available, economically feasible technology. They are also to exchange information concerning national policies, scientific activities, and technical measures aimed at combating the risks of pollution. According to the terms of Art. 5, consultations shall be held at an early stage between contracting parties that are affected by or exposed to a significant risk of long-range transboundary air pollution and parties within which and subject to whose jurisdiction a significant contribution to this pollution originates or could originate in connection with activities carried on or contemplated therein. Art. 9 calls for implementing a cooperative program for monitoring and evaluating long-range transmission of air pollutants in Europe, including continuous monitoring of sulfur dioxide and related substances not only in the air, but in other media, such as water, soil, and vegetation, utilizing comparable or standardized procedures, and establishing a monitoring program and exchange of data on emissions.

The cooperative program for monitoring and evaluating the long-range transmission of air pollutants in Europe (EMEP) provides a framework for

fulfilling the Convention's obligations. See Chapter V, Section B.1. Regulatory priority has been given to the reduction of sulfur emissions. A protocol to this effect was adopted by 21 countries on July 8, 1985, in Helsinki, and became the first international treaty to contain precise and verifiable objectives to combat air pollution. It required states to reduce their national sulfur emissions by at least 30 percent as soon as possible and at the latest by 1993, using 1980 levels as the basis for calculation. Implementation is supervised by EMEP utilizing its monitoring system and by state reporting on national annual sulfur emissions, including the basis on which they have been calculated.

By 1986, ten countries had already achieved the 30-percent reduction. It appeared, however, that the reductions were counterbalanced by sulfur increases in countries not party to the Protocol. Rio Conference Agenda 21 included as a topic for future action the control of transboundary atmospheric pollution. UN Doc. A/CONF.151/26, No. 9.1–9.35. Conforming to this aim and drawing upon the principles of the Rio Declaration, the parties to the Geneva Convention adopted a new Protocol on Further Reduction on Sulfur Emissions (Oslo, June 14, 1994). The Protocol refers to the precautionary principle and expresses a new concern in stating that measures to control emissions of sulfur and other air pollutants should also contribute to protecting the sensitive Arctic environment. The main obligation of the parties is to ensure, as far as possible without entailing excessive costs, that the presence or deposition of oxidized sulfur compounds in the long term do not exceed critical loads for sulfur represented on a map of Europe in Annex I. Art. 2(1). Emissions limits were not abandoned, however, because as a first and minimum step, the parties agreed to reduce and maintain their annual sulfur emissions in accordance with the timing and levels specified in Annex II. The Annex contains a table determining the emission levels in 1980 and in 1990, the sulfur emission ceilings per year in 2000, in 2005, and in 2010 and the percentage emission reductions in 2000, 2005, and 2010, taking 1980 as a base year.

Art. 2(4) of the 1994 Protocol lists the most effective measures for the reduction of sulfur emissions for new and existing sources. The measures include increasing energy efficiency, utilizing renewable energy, reducing the sulfur content of particular fuels, and applying the best available technology not entailing excessive cost. Annex V sets forth emission limit values for major stationary sources, while Annex IV proposes control technologies for sulfur emissions from stationary sources.

The problem of nitrogen oxides proved more difficult to solve, in part because a principal source of this pollution is motor vehicles, whose regulation is a politically sensitive issue in many countries. Nonetheless, in the wake of Community directives and alarming reports by EMEP, the parties signed the Protocol Concerning Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes on October 31, 1988, calling for the reduction of emissions and transboundary fluxes of nitrogen oxides (NO_x) from

fixed or mobile sources, with the aim of stabilizing them at the 1987 level by the year 1995. The agreement entered into force on February 14, 1991. Twelve of the 25 signatory states also made a Declaration undertaking to reduce NO_x emissions by at least 30 percent by 1988, as compared with any year between 1980 and 1986.

The LRTAP parties concluded a fourth Protocol Concerning the Control of Emissions of Volatile Organic Compounds (VOC) or their Transboundary Fluxes (Nov. 18, 1991). In the presence of sunlight, VOCs react with nitrogen oxides to form ground-level ozone, which is harmful to health and the environment. The Protocol generally obliges the parties to control their emissions of VOCs in order to reduce their transboundary fluxes and the fluxes of the resulting secondary photochemical oxidant products. Art. 2(1). Each party has to foster public participation in emission control programs through public announcements, encouraging the best use of all modes of transportation, and promoting traffic management schemes. Art. 2(3)(a)(iv).

A Meeting of the European Ministers for Environment held in Aarhus in June 1998 adopted two more protocols to the LRTAP Convention. First, the Protocol on Persistent Organic Pollutants (POPs) addresses pollutants that resist degradation under natural conditions and have been associated with adverse effects on human health and the environment. POPs can biomagnify in upper trophic levels to concentrations that could affect the health of exposed wildlife and humans. The Arctic ecosystems and especially their indigenous people, who subsist on Arctic fish and mammals, are particularly at risk. Art. 3 lists the basic obligations of the contracting parties: eliminate the production and use of the substances listed in Annex I and ensure that the destruction or disposal is undertaken domestically in an environmentally sound manner. A parallel Protocol on Heavy Metals, adopted the same day as the POPs Protocol, contains many corresponding provisions.

The most recent LRTAP Protocol was adopted in order to apply a multi-effect, multipollutant approach to prevent or minimize exceeding critical loads and levels. Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone (Gothenburg, Nov. 30, 1999). This Protocol is the first agreement under the Convention to deal specifically with reducing nitrogen compounds. According to Art. 2, the objective of the Protocol is to control and reduce emissions of sulphur, nitrogen oxides, ammonia, and volatile organic compounds that are caused by anthropogenic activities and are likely to cause adverse effects on human health, natural ecosystems, materials, and crops.

The protocols demonstrate the aptitude of the treaty system established by the 1979 LRTAP Convention to evolve and develop new techniques. They are also a good example of the permanent negotiations carried on through conferences of the parties, which have become an indispensable part of international environmental law. Finally, they show the increasing place of detailed technical approaches to international environmental protection.

Outside the geographic region of the LRTAP Convention system, forest fires devastated Brunei and Indonesia in the closing years of the 20th century, producing a heavy haze that polluted the atmosphere and caused serious health problems not only in the originating countries but also in Malaysia, Myanmar, Singapore, and Thailand. In 1997, in response to the problem, ASEAN adopted a Regional Haze Action Plan followed in 2002 by an Agreement on Transboundary Haze Pollution (Kuala Lumpur, June 10, 2002).

The Agreement defines haze pollution as smoke resulting from land and/or forest fire that causes deleterious effects of such a nature as to endanger human health, harm living resources, ecosystems, and material property, and impair or interfere with amenities and other legitimate uses of the environment. The Agreement aims at preventing and monitoring such pollution, which should be mitigated through concerted national efforts and intensified regional and international cooperation. To that effect, precautionary and preventive measures should be taken, when necessary, by developing and implementing international measures aiming at controlling sources of fires, identifying fires, creating monitoring, assessment, and early warning systems, exchanging information and technology, and providing mutual assistance. The parties shall take appropriate measures to monitor all fire-prone areas, land and/or forest fires, the environmental conditions conducive to such fires, and haze pollution arising from them, as well as the necessary preventive measures. Technical cooperation should include relevant training, education, and awareness-raising campaigns, in particular relating to the promotion of zero-burning practices and raising awareness of the impact of haze pollution on human health and the environment. Markets for the utilization of biomass and appropriate methods to treat agricultural wastes should be developed.

In bilateral relations, systematic cooperation between Canada and the United States has existed since the January 11, 1909, Treaty Respecting Boundary Waters between the United States and Canada, 36 Stat. 2448, TS No. 548, which created the International Joint Commission for the protection of boundary waters. See Chapter III, Section B.3. The Commission has been invoked in several instances of air pollution, notably in the *Trail Smelter* case. In 1978, the two states established a bilateral research group on the long-range transport of atmospheric pollutants. On August 5, 1980, a memorandum of intent was signed in Washington, establishing joint working groups to prepare a formal agreement. Memorandum of Intent between Canada and the United States Concerning Transboundary Air Pollution (Aug. 5, 1980), 32 UST 2521, 20 ILM 690 (1981).

At the same time, the memorandum called for national measures and a procedure for notification and consultation in regard to projected activities that could cause significant increases in air pollution. The two countries concluded a special agreement in Ottawa, August 23, 1983, concerning research into the effects of weather on long-range trans-

boundary air pollution. Memorandum of Understanding between Canada and the United States on the Cross Appalachian Tracer Experiment (Aug. 23, 1983). Subsequently, the Great Lakes Water Quality Agreement was amended to include air pollution among the regulated subjects. Finally, on March 13, 1991, the two countries signed an Agreement on Air Quality whose general objective is to control transboundary air pollution. The parties commit themselves to establish specific objectives for emission limitations or reductions of specific air pollutants (Art. 4). Annex I establishes objectives for sulfur dioxide and nitrogen oxides, separately and differently for the United States and for Canada.

3. Stratospheric Ozone Depletion and Global Climate Change

In the 1980s scientists discovered two global problems related to the emission of substances into the atmosphere: the depletion of the stratospheric ozone layer and the threat of a major, anthropogenic change in the global climate.

a. Ozone Depletion

Ozone is a form of oxygen, containing one more atom than the oxygen breathed in the atmosphere. While ground-level ozone in the form of “smog” produces harmful environmental consequences, stratospheric ozone, whose strongest concentrations are found between 20 and 25 kilometers above earth, filters a part of the sun’s ultraviolet radiation, which otherwise would injure life on earth. The absorption of ultraviolet rays by stratospheric ozone is also a source of climatic energy. According to a study prepared under the aegis of UNEP, a reduction in ozone risks not only an increase in the number of human skin cancers and harm to the eyes but also has unforeseen biological effects, because all living beings have evolved under the protection of the ozone layer.

The anthropogenic source of ozone depletion was clear by the late 1970s. The utilization of chlorofluorocarbons (CFCs), contained in aerosol sprays and to a lesser extent in solvents and refrigeration, was identified as a major contributing cause. When first developed, CFCs were viewed favorably, because they are non-toxic, non-flammable, non-corrosive, and stable. The very stability of CFCs is the source of the problem, because they migrate over long distances and survive for many years. When they reach the stratosphere intact, solar radiation breaks the molecules apart to free reactive chlorine atoms, catalyzing chain reactions that destroy ozone; even if production and use of ozone-depleting substances are phased out, the problem will remain for some time because of the substances already released. By 1985, it was understood that most depletion of the ozone layer occurs on a seasonal basis above Antarctica and, increasingly, over the Arctic region. The Antarctic

ozone hole has expanded to a size greater than North America, and scientists expect it to begin shrinking only in 30 to 50 years as ozone-depleting substances are removed from the atmosphere.

The discovery that widely used chemical substances were destroying stratospheric ozone induced a number of countries in the early 1980s to ban the use of CFCs for aerosol sprays. At the same time, their general use made it obvious that the problem could not be solved unilaterally or even regionally. Thus, UNEP made protection of stratospheric ozone a priority item in its legal Action Plan and after several years of effort, succeeded in negotiating the Convention for the Protection of the Ozone Layer (Vienna, Mar. 22, 1985).

The treaty is a framework convention, providing the basis for systematic cooperation among the states parties to ensure the continued existence of stratospheric ozone. The general obligation of states parties, however, is directed more at the consequences of the depletion—to take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities that modify or are likely to modify the ozone layer. Art. 2. The Convention details the duty to cooperate in research and scientific assessments. It also requires cooperation in the legal, scientific, and technical fields, including the exchange of information. States parties generally are to make known their laws, their national administrative measures, and legal research relevant to protection of the ozone layer, as well as relevant methods and terms of licensing and availability of patents.

According to the Vienna Convention Art. 8, the Conference of the Parties (COP) may adopt protocols to the Convention. The COP adopted the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, Sept. 16, 1987) at a time when scientific uncertainty remained about global ozone loss and increases in ultraviolet radiation reaching the earth. The action taken in adopting the Protocol thus represented the first significant application of the precautionary principle in international environmental law.

The Montreal Protocol foresees the control of various forms of chloro-fluorocarbons and halons and their progressive elimination. Industrial countries agreed to cut production and use of CFCs in half by 1998, and to freeze production and use of halons by 1992. Countries with an annual consumption of CFCs under 0.3 kilograms per capita, which were mainly developing countries, were given a ten-year period to comply. The Protocol also restricted trade between states parties and non-parties to discourage defections and provide states with an incentive to join the treaty, thus addressing the free rider problem.

The Montreal Protocol came into force on January 1, 1989. New information indicated that ozone losses were two to three times more severe than had been predicted. Participating states then adopted a declaration calling for accelerated phase-out of substances that destroy stratospheric ozone, in light of scientific findings. The parties agreed on new and shorter

deadlines for the complete phase-out of these substances. Later amendments to the Montreal Protocol endorsed a financial mechanism and an interim international fund consisting of voluntary contributions from the industrialized nations in order to assist developing countries in meeting the costs of compliance with the Convention and Protocols. For the first time, an international environmental treaty called for financial transfers from industrialized to developing countries.

The Fourth Meeting of the parties (Copenhagen, Nov. 1992) advanced the phase-out dates for industrial countries to 1994 for halons and to 1996 for CFCs, methyl chloroform, and carbon tetrachloride. It also took up the question of hydrochlorofluorocarbons (HCFCs), a proposed substitute for CFCs that is still ozone-depleting but less so than CFCs. The agreement called for their complete phase-out by 2030. A 1995 meeting in Vienna added a phase-out for methyl bromide to the year 2010 for industrialized countries. The meeting also strengthened requirements for industrialized-country use of HCFCs, and added a complete phase-out by 2040 for developing countries. Subsequently, the states parties adopted new reduction schedules for a number of ozone-depleting substances, as well as decisions on illegal trade in such substances and on financial issues.

With the various actions taken by the states parties, the 1985 Vienna Convention for the Protection of the Ozone Layer has grown into an international treaty system composed of the Convention itself, the Montreal Protocol, and its amendments. It is managed by the Conference of the Parties to the Vienna Convention, the Meeting of the Parties to the Montreal Protocol, a Financial Mechanism, and a secretariat.

Ninety-six chemicals are controlled by the ozone treaty regime as of the beginning of 2007. These include: halo carbons, notably chlorofluorocarbons (CFCs) and halons, carbon tetrachloride, methyl chloroform (1,1,1 trichloroethane), hydrobromofluorocarbons (HBFCs), hydrochlorofluorocarbons (HCFCs), methyl bromide (CH₃Br), bromochloromethane (BCM), a new ozone-depleting substance that some companies sought to introduce into the market in 1998, was targeted by the 1999 Amendment for immediate phase-out to prevent its use. The phase-out schedules for developed countries on these products are as follows: phase out halons by 1994; phase out CFCs, carbon tetrachloride, methyl chloroform, and HBFCs by 1996; reduce methyl bromide by 25 percent by 1999, 50 percent by 2001, 70 percent by 2003, and phase out by 2005; reduce HCFCs by 35 percent by 2004, 65 percent by 2010, 90 percent by 2015, and 99.5 percent by 2020, with 0.5 percent permitted for maintenance.

International efforts to protect the ozone layer have had substantial impact. By 1995, global production of the most significant ozone-depleting substances, the CFCs, was down 76 percent from the peak year of 1988. Several countries and regions advanced beyond the agreements. The EU announced a phase-out of HCFCs by 2015, five years before it is legally required to do so. The U.S. Clean Air Act mandates phase-out of methyl bromide nine years ahead of the Protocol requirements. Other countries

similarly have accelerated their compliance. Although the task is not complete, the international community clearly responded to the issue. What may be important for the future is to ensure compatibility between the ozone and climate change regimes, as several substitutes for ozone depleting substances are greenhouse gases.

b. Climate Change

The other major global problem of the atmosphere is “climate change,” meaning a change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and is, in addition to natural climate variation, observed over a comparable time period. UN Framework Convention on Climate Change (New York, May 9, 1992), Art. 1(2). The adverse effects from this change have been characterized as changes in the physical environment or biota, which have significant deleterious effects on the composition, resilience, or productivity of natural and managed ecosystems or on the operation or socio-economic systems or on human health and welfare.

Since the 1960s scientists have expressed concern that a generalized warming of the planet’s atmosphere might lead to changes in the global climate. The global average temperature between 1866 and 1996 increased by more than one degree. The 1990s were the warmest decade on record and included the seven warmest years ever recorded. The accumulation of gases, such as carbon dioxide, nitrous oxide, methane, chlorofluorocarbons and tropospheric ozone, is viewed as at least partly responsible for the warming. There is evidence that the carbon dioxide concentration in the atmosphere today is 25 to 30 percent higher than what it was in the pre-industrial times. In 2001, the Intergovernmental Panel on Climate Change, a network of more than 2,000 scientists and policy experts advising governments on climate policy, concluded that most of the warming observed in the last 50 years has been due to the increase in greenhouse gas concentrations attributable to human activity.

Carbon dioxide is a basic by-product of the combustion of fossil and other natural fuels such as wood, coal, oil, and gasoline. Other significant greenhouse gases are chlorofluorocarbons, which also contribute to the depletion of the ozone layer, methane, and nitrous oxide. Methane is a metabolic by-product of animals (including humans) and is produced in significant quantities by domestic cattle. It is also a by-product of petroleum production and, when burned as a fuel (i.e., “natural gas”), has been considered as a benign or environmentally “friendly” fuel, in terms of both its global warming potential and its less severe contribution to more “traditional” forms of air pollution. Nitrous oxide has various industrial applications as an aerosol propellant, and is used as an anesthetic gas. The accumulation of these gases acts as an insulating blanket that traps the energy of sunlight and prevents it from radiating back into outer space.

The accumulation of solar energy causes a gradual increase in the average temperature of the earth's surface.

The trend towards increasing temperatures is likely to result in rising sea levels from the melting of the Greenland ice sheet and from the thermal expansion of sea water. A rise in the world's sea levels of approximately 50 centimeters, which is possible during the coming decades, would wreak havoc with the low-lying coastal areas that are home to a substantial proportion of the world's population. According to some projections, many small islands would be submerged or become unsafe, and huge areas of heavily populated countries, such as Bangladesh or Indonesia, could become uninhabitable. Louisiana has already lost significant amounts of coastal land because of a recent rise in the Gulf of Mexico, with New Orleans itself at risk for the future, illustrated by the hurricane Katrina. According to one estimate, approximately 5 million square kilometers may be threatened by the year 2075, an area that represents 3 percent of the world's land mass, one-third of global cropland and home to a billion people. See *STATE OF THE WORLD 2001*, 168 (L. Brown et al. eds., 2001).

Climate change also would modify the world's agriculture: some areas would become arid, while other regions that are presently too cold would become able to grow cereals, corn, or fruit, and other products needing a warmer climate. Increased water temperatures would disrupt aquatic ecosystems and further burden already distressed fisheries. A particularly sinister consequence of global climate change is the multiplication of violent weather patterns, including severe drought, tropical storms, hurricanes, unusually heavy rainfalls, and the consequential floods and landslides. In addition, a slight rise in average annual air temperature could greatly increase the risk of insect outbreaks. Warmer weather speeds up insect metabolism, making them grow more quickly, breed more frequently, and migrate sooner and further. Tropical diseases carried by pests and micro-organisms, including malaria and dengue fever, may become widely endemic throughout new areas.

The global warming issue exemplifies the principle that all activity in the biosphere is interrelated and interdependent. In addition to industrial and automotive emissions from developed countries, a large part of global warming results from agricultural and resource activities in developing countries. Tropical deforestation is a serious problem that concerns more than loss of renewable resources and biological diversity; two aspects of deforestation contribute significantly to global warming. First, much of the deforestation that occurs in tropical countries results from land-clearing for agriculture. The topsoil in most tropical countries is so poor that it cannot sustain crops for more than one or two seasons. The farmers then move and clear still more forest, typically by means of the "slash and burn" technique. The trees are chopped down or bulldozed, followed by the burning of all the native vegetation and the unusable wood that remains. Industrialized logging practices increase the destruc-

tion through burning large areas to clear roads. This unsustainable exploitation of tropical forests contributes to the greenhouse effects, because forests and oceans are natural “sinks” that remove greenhouse gases by absorbing carbon dioxide. Although it is difficult to know the exact proportion of such absorption, deforestation hinders the process and thus enhances global warming.

The first signs of international concern over climate change emerged in a series of international conferences on CO₂ between 1985 and 1987. On December 6, 1988, the UN General Assembly adopted Resolution 43/53 on the conservation of the global climate for present and future generations of mankind. It stated that climate change is a “common concern of mankind,” and that it was necessary to adopt promptly the necessary measures to deal with it within a global framework.

On December 21, 1990, the UN General Assembly adopted another resolution on the protection of the world climate for present and future generations. The Resolution reflected a desire for an Intergovernmental Negotiating Committee to prepare a general and effective convention on climate change.

The UN Framework Convention on Climate Change was adopted on May 8, 1992, in New York and opened for signature during the Rio de Janeiro Conference. It defines climate change as a modification of the climate that is attributed directly or indirectly to human activity, which alters the composition of the global atmosphere, and that is in addition to natural climate variability observed over comparable time periods. Art. 1(2). The stated objective is to stabilize the concentrations of all greenhouse gases in the atmosphere at a level that will prevent dangerous anthropogenic interference with the climate system. Art. 2. In this regard, precautionary measures must be taken to anticipate, prevent, or minimize the causes of climate change and mitigate its adverse effects. Art. 3(3).

The obligations of all parties are mainly contained in Arts. 4 and 12: developing, periodically updating, publishing, and making available national inventories of anthropogenic emissions and sinks; formulating and implementing national and regional programs containing measures to mitigate climate change; promoting the application of processes that control emissions including transfer of technologies; promoting sustainable management of sinks and reservoirs of all greenhouse gases; elaborating integrated plans for coastal zone management and cooperation in research. Art. 4(1).

The Convention recognizes the necessity of returning to earlier levels of anthropogenic emissions of carbon dioxide and other greenhouse gases (Art. 4(2)(a)), but sets no specific timetables and targets for limiting such emissions, establishing only that the parties’ obligations differ. Applying the principle of common but differentiated responsibilities and capabilities, the treaty provides that its developed country parties should take the lead in combating climate change and its adverse effects. Art. 3(1). Annex I to the Convention lists as developed 36 countries and the European

Community; they pledge to adopt national and regional policies and take corresponding measures to mitigate climate change by limiting their emissions of greenhouse gases and protecting and enhancing their greenhouse sinks and reservoirs. They recognize the need for equitable and appropriate contributions to the global effort. To this end, each is obliged to communicate, within six months of the entry into force of the Convention for it, and periodically thereafter, detailed information on its policies and measures. This information is reviewed by the Conference of the Parties. Each of the developed parties shall coordinate with other such parties, as appropriate, relevant economic and administrative instruments developed to achieve the objective of the Convention. Art. 4(2).

The developed country parties are to provide new and additional financial resources to meet the agreed full costs incurred by developing countries in complying with their obligations relating to the communication of national inventories and other measures taken or envisaged to implement the Convention. Developed states also must assist developing countries that are particularly vulnerable to adverse effects of climate change in meeting costs of adaptation to those adverse effects. Art. 4(3), (4). The transfer of environmentally sound technologies is particularly stressed, but the development and enhancement of endogenous capacities and technologies should also be supported. Art. 4(5). The Convention explicitly provides that the extent to which developing countries will implement their commitments depends on the effective implementation by developed countries of their commitments related to financial resources and transfer of technology. Art. 4(7).

The parties to the UNFCCC can choose from a range of policy options to counter anthropogenic climate change, some of the policies having important impacts on national economies. Measures could include improving energy efficiency, forest management, air pollution control, fuel switching, and restructuring transportation. Many environmental economists support carbon taxes as a way to establish appropriate incentives away from polluting fuels. Reforestation and other measures to expand carbon sinks are also possible.

A Conference of the Parties, held December 1–10, 1997, adopted the Kyoto Protocol, moving towards the development of precise rules to mitigate anthropogenic climate change. The Protocol specifies different goals and commitments for developed and developing countries concerning future emissions of greenhouse gases. The main features of the Protocol are the reduction targets accepted by the industrialized countries, without corresponding obligations for developing countries; acknowledgment of the role of sinks (seas, forests) of greenhouse gases and their inclusion in the targets; the possible creation of “bubbles” and trading emissions as means for reducing their aggregate emissions and joint implementation agreements with countries that only emit small amounts of greenhouse gases, in principle developing countries.

The Protocol adopts a “big bubble approach”: developed countries are allowed to join together and thereby attain their emission reduction commitments jointly by aggregating their anthropogenic carbon dioxide equivalent emissions of greenhouse gases listed in Annex A. Emissions should be reduced by at least 5 percent (averaging 5.2 percent) below 1990 levels by the first commitment period of 2008–2012. These reductions cover six greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Thus, if a state party is able to limit emissions of greenhouse gases other than carbon dioxide, restrictions on the use of fossil fuels may be correspondingly relaxed. Each state of this group shall, by 2005, have made demonstrable progress in achieving its commitments under the Protocol. Former communist countries in economic and political transition benefit from a certain degree of flexibility in the implementation of their commitments. Art. 3(6). They may use, for example, a different base year to determine the reduction of their emission. Art. 3(5).

Art. 2 lists methods that may be used in order to achieve quantified emission limitation and reduction: enhancement of energy efficiency, protection and enhancement of sinks and reservoirs of greenhouse gases, promotion of sustainable forms of agriculture, increased use of new and renewable forms of energy and of environmentally sound technologies, reduction or phasing out of market imperfections, the use of economic instruments, limitation and reduction of emissions of greenhouse gases in the transport sector, and limitation and/or reduction of methane through recovery and use in waste management.

Another specific form of cooperation in the reduction of greenhouse gases is emission trading. According to Art. 6(1), any developed country, for the purpose of meeting its commitments, may transfer to or acquire from, any other party emission reduction units resulting from projects aimed at reducing emissions. It also can enhance removals of greenhouse gases in any sector of the economy. The condition is that any such project provides a reduction in emission by sources or an enhancement of removal by sinks, which is additional to any that would otherwise occur. The acquisition of emission reduction units thus shall be supplemental to domestic actions for the purposes of meeting commitments under Art. 3. A developed country may also authorize legal entities to participate, under its responsibility, in actions leading to the generation, transfer, or acquisition of emission reduction units. Art. 6(3). The COP defines the relevant principles, modalities, rules, and guidelines, in particular for verification, reporting, and accountability for emission trading. Art. 16bis.

Any emission reduction units, or any part of an assigned amount, that a party acquires from another party, shall be added to the assigned amount for that party. Art. 3(10). Parallel to this provision, Art. 3(11) foresees that any emission reduction units, or any part of an assigned amount, that a party transfers to another party, shall be subtracted from the assigned amount for that party.

In addition to bubbles and trading, Art. 12 outlines a “clean development mechanism” the task of which is to assist developing countries in achieving sustainable development and in contributing to the ultimate objective of the convention. It also may assist developed countries in achieving compliance with their quantified emission limitation and reduction commitments. On a voluntary basis, emission reductions resulting from each project activity shall be certified by operational entities to be designated by the COP and approved by each party involved. Art. 12(5). Developing countries will benefit from project activities resulting in certified emission reductions, while developed countries may use the certified emission reductions accruing from such project activities to contribute to compliance with their quantified emission limitation and reduction commitments. Art. 12(3)(b). The clean development mechanism will assist in arranging funding of certified project activities as necessary. Certified emission reductions obtained during the period 2000 to 2008 can be used by developed countries to assist in achieving compliance in the commitment period 2008 to 2012.

Monitoring of greenhouse gases plays an important role in the Kyoto Protocol. Developed countries must establish national systems to estimate anthropogenic emissions by sources and removals by sinks (Art. 5), as well as annual inventories to incorporate the supplementary information necessary to demonstrate compliance with the commitments accepted under the Protocol (Art. 7). Such information will be reviewed by teams composed of experts nominated by parties to the Framework Convention and, as appropriate, by intergovernmental organizations coordinated by the Secretariat. The information submitted by the parties and the reports of the expert reviews shall be submitted to the COP, which can take decisions on any matter required for the implementation of the Protocol. Art. 8.

Arts. 10 and 11 of the Protocol concern developing countries. Their emissions are not limited, but they should formulate, where relevant, cost-effective national and, where appropriate, regional programs to improve the quality of local emission factors, formulate, implement, publish, and regularly update national or regional programs to mitigate climate change, taking into account all relevant economic activities. Developed party cooperation with developing countries shall include the transfer of, or access to, environmentally sound technologies, know-how, practices, and processes pertinent to climate change, as well as capacity-building. New and additional financial resources should be provided to meet the agreed full costs incurred by developing country parties in advancing the implementation of existing commitments.

The COP of the UNFCCC serves as the Meeting of the Parties to the Kyoto Protocol. It keeps under regular review the implementation of the Protocol and makes the decisions necessary to promote its effective implementation. It assesses, on the basis of the information made available to it, the overall effects of the measures taken and makes recommendations on any matters necessary for the implementation of the Protocol. Art. 13.

The COP approves appropriate and effective procedures and mechanisms to determine and to address cases of non-compliance with the provisions of the Protocol. Art. 17. Any body or agency, whether national or international, governmental or non-governmental, that is qualified in matters covered by the Protocol, may be admitted as an observer, unless at least one-third of the parties present at the meeting objects. Art. 13. The Secretariat and the subsidiary bodies established by the Framework Convention shall be used for the Protocol. Arts. 14 and 15.

C. BIOLOGICAL DIVERSITY

The interaction of humans with other living organisms has been the subject of discussion, debate, and regulation throughout history. A belief in human dominion over the earth and all its living resources led many to see other species as having only utilitarian value. A contrary view accepts that living organisms may be utilized, but sees humans as having a moral obligation of stewardship or trusteeship towards nature that implies restraint in the use of and respect for all life. Certain ethicists and activists go further and contend that living creatures should not be exploited except where unavoidable to fulfill basic human needs.

The diversity of life increasingly is threatened by exploitation, the destruction of habitats, pollution, and a wide range of activities that also negatively impact ecological processes. Extinction of species, although part of the natural order, has reached alarming proportions since the beginning of the industrial revolution. It is estimated that in less than two centuries, 128 species of bird and 95 species of mammals have disappeared. In some regions, over half the endemic species have become extinct since 1950.

The use and protection of plants and animals traditionally has been considered part of state sovereignty over natural resources. Laws within states often were limited to hunting and fishing regulations concerning designated animal species. Plants on public lands were generally free to be taken and utilized. Initial regulation came because commercially harvested species or stocks on the high seas had to be protected from unsustainable exploitation. Later, another reason for adoption of bilateral or multilateral conservation rules was recognized: species whose range or habitat extends into the territory of more than one state may require cooperative efforts to ensure the species' survival.

Early measures of protection of living resources were scattered among international rules that addressed the problem in a fragmentary fashion. The regulations that were adopted also were incomplete; most often they forbade taking examples of protected species but failed to adopt measures to ensure that habitat conditions supported the survival of the species. Subsequent agreements expanded the focus to consider the role of species in the ecosystem in which they occur and the need to preserve genetic diversity in the light of new threats, including inadvertent or accidental harm

from pollution due to oil spills, pesticides and other harm to wildlife habitats. Recently, an ecosystem approach that looks beyond protecting specific species has been coupled with efforts to develop improved compliance techniques and increased participation of non-governmental actors.

A fundamental change of attitude towards wildlife is reflected in Principle 4 of the 1972 Stockholm Declaration:

Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat which are now gravely imperiled by a combination of adverse factors. Nature conservation, including wildlife, must therefore receive importance in planning for economic development.

This statement was followed in 1980 by the World Conservation Strategy, prepared by IUCN in cooperation with the UN Environment Program, the World Wide Fund for Nature, the FAO, and UNESCO. It defined three major nature conservation goals: maintain essential ecological processes; preserve genetic diversity; and sustainably use species and ecosystems. The World Charter for Nature (Oct. 28, 1982) reaffirmed these goals. After proclaiming in its preamble that “every form of life is unique, warranting respect, regardless of its worth to man,” the Charter declares in Principles 2 and 3:

2. The genetic viability of the earth shall not be compromised; the population levels of all life forms, wild and domesticated, must be at least sufficient for their survival, and to this end necessary habitats shall be safeguarded.
3. All areas of the earth, both land and sea, shall be subject to these principles of conservation; special protection shall be given to unique areas, to representative samples of all the different types of ecosystems and to the habitats of rare or endangered species

These principles opened a new era in conservation policy, reflecting awareness of the planetary dimension of the issues. Conservation of species and of their habitats became integrated into a broader conceptual framework focused on safeguarding the genetic heritage of the planet. The need for comprehensive norms to protect the earth’s biological diversity became increasingly apparent and led to the adoption at the Rio Conference in 1992 of the UN Convention on Biological Diversity (CBD), discussed at Section C.1. The Convention sets forth a general framework or normative umbrella that is reinforced by other legal instruments relating to particular species, areas, and means of protection.

International agreements on nature protection or biological diversity can be grouped into three main categories. First, there are treaties that aim to protect biological diversity in general. Second, there are conven-

tions that aim to protect broad categories of biological resources through use of a particular legal technique (habitat protection, restrictions on international trade). Third, a group of multilateral and bilateral treaties aim at conserving a single species or higher taxonomic group: whales, bats, seals, migratory birds.

In general, the texts safeguard the individuals that comprise the species, not the species as an abstraction apart from the individual animals. Nonetheless, the abstraction exists, because the characteristic genes of each species confer a range of different qualities to each of its individual members. It is this genetic fund that is to be protected and transmitted to future generations to ensure the variability within each species. A major task of international environmental law is to assure the conservation and transmission of this fund, the greatest material resource of the earth.

International treaties for the protection of living organisms contain many common obligations, such as the duty to adopt regulatory measures for nature conservation. Older treaties promoted the creation of protected areas (e.g., the Ramsar Convention on the Conservation of Wetlands (Feb. 2, 1971), the Convention on the World Cultural and Natural Heritage (Nov. 23, 1972), and protocols on specially protected areas of regional seas), although states remained free to nominate or remove the names of particular areas from the international lists. The CBD goes beyond these measures to require, in addition, the identification and management of destructive activities.

1. The Convention on Biological Diversity

The UN Conference on the Environment and Development opened for signature the CBD on May 22, 1992. It was the first global comprehensive instrument on the earth's biological resources. The Convention entered into force on December 29, 1993. The CBD establishes guidelines for conduct towards all life on the planet, guidelines that are to be implemented through national conservation strategies and plans of action, taking into account the regulations contained in other international agreements. Biological diversity, or biodiversity, has thus become a unifying concept denoting all living organisms and their intricate interdependence. It has replaced nature conservation as the primary term used in regulating human actions towards other components of the living world.

Biological diversity is defined in CBD Art. 2 as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." The broad definition includes wild and domesticated animals and wild and cultivated plants found on land and seas, whether within or outside areas under national sovereignty or jurisdiction. The CBD's three levels of biological diversity—genetic diversity, species diversity, and ecosystem diversity—encompass the components of life, different life forms, and

the interrelationships of all of them. The first Conference of the Parties decided, however, that the definition excludes human beings, organs, and genetic material.

Genetic diversity refers to the variability of the genetic makeup within a single species. Flowering plants contain over 400,000 genes and even bacteria have more than 1,000. In general, no two organisms are genetically identical; the smaller the number of individuals within a species, the less internal genetic diversity the species retains. Inbreeding may result in reduced fertility and increased susceptibility to disease or negative mutation. The threat to the future is particularly pronounced in agriculture, where food security rests on a few grain species with consequent loss of variable characteristics. Some 20 species account for more than 90 percent of the world's food.

Species diversity means the diversity between species of living organisms within a specific habitat or ecosystem; by definition species cannot breed with other species. The number of species on earth is not known. While more than 1.5 million species have been described by scientists, the total number is estimated to be at least 5 to 10 million, and some estimates are as high as 50 million. Vertebrates are the most studied order, but the least numerous, about 4,200 mammal species and 9,000 species of birds have been described, compared to 250,000 species of higher plants. Least well known are lichens, bacteria, and fungi. New species are still being found. Nearly one-third of the 6,300 reptile, 23,000 fish, and 4,000 amphibian species have been identified in the past 20 years. The numbers of undiscovered species, especially insects, plants, and micro-organisms probably runs to the millions.

Living resources are unevenly distributed throughout the world, with the highest concentration of terrestrial species in humid tropical zones and the greatest marine diversity in coastal areas and coral reefs. Also, generally, diversity decreases with altitude on land and depth in the oceans; however, little is known about the deep seabed species. Islands like Madagascar and Hawaii are rich in endemic species, as are the lakes of Africa and the countries of the Amazon forest (one in five of the earth's higher plants are found in Amazonia). Freshwater diversity is also important but poorly known.

Ecosystem diversity denotes the range of natural habitats, biotic communities, and ecological processes within which species variety has evolved and to which they are uniquely adapted. Each species depends upon the surrounding environment for its survival and reproduction: temperature, humidity, water, soil, and nutrition. Ecosystems contain a complex interrelationship of species and functions leading towards natural equilibrium. The diversity of ecosystems is itself an essential part of biological diversity. Some species may be identified as sentinel species, those, such as frogs and some other amphibians, that are sensitive to environmental change and thus important indicators of the health of an ecosystem.

The CBD takes an integrated rather than a sectoral approach to the conservation and sustainable use of biological diversity. The Convention has three broad purposes: (1) the conservation of biological diversity, (2) the sustainable use of its components, and (3) the fair and equitable sharing of benefits arising from appropriate access to and the use of genetic resources.

The Convention primarily concerns the rights and responsibilities of states at the national level. Their general obligation is to take effective national action to halt the destruction of species, habitats, and ecosystems, including the adoption of regulations on conservation of biological resources, legal responsibility, regulation of biotechnology, and norms on access to and compensation for use of genetic materials. The states parties are to apply the Convention requirements inside their territorial limits, as well as to processes and activities under their jurisdiction or control wherever located.

The Convention contains several innovative features. Biological diversity is recognized as a common concern of humankind, reversing a traditional principle of free access to genetic resources. It makes clear that “the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.” Developing countries insisted on this extension of the norm of permanent sovereign over natural resources and the correlative requirement of prior informed consent by the party providing the genetic resource. Art. 15.5. It may be viewed as the counterpart to developed country efforts to ensure intellectual property rights over industrial development of products derived from biological resources, including living material itself. The Convention reflects a compromise, taking a positive stance on the flow of genetic resources by calling on states parties to facilitate access for environmentally sound uses and not to impose restrictions that are counter to the objectives of the Convention. Balanced with this access, other states parties must take measures to share “in a fair and equitable way” the results of research and development of uses of genetic resources with the state providing those resources.

The emphasis on national sovereignty is balanced by enunciating broad state duties. The preamble indicates that states “are responsible for conserving their biological diversity and for using their biological resources in a sustainable manner.” The body of the Convention details several specific obligations on states parties, including a requirement that they identify important components of biological diversity and priorities that may need special conservation measures, and identify and monitor processes and activities that may have significant adverse effects on biological diversity. Art. 7. With this information, they must develop national strategies and plans integrating conservation of biological diversity into relevant sectoral plans and programs and decisionmaking. Art. 6. The planning requirement is reinforced by the requirement in Art. 10(a) that parties

integrate consideration of the conservation and sustainable use of biological resources into national decisionmaking. Annex I contains indicative lists for the identification and monitoring of (1) ecosystems and habitats, (2) species and communities, and (3) genomes and genes of social, scientific, and economic importance.

After long debate among the negotiators, the Convention established a preference for *in situ* conservation, with *ex situ* conservation used to complement *in situ* measures. *In situ* conservation is defined as “conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.” Art. 2. Conservation measures range from establishment of protected areas to rehabilitation of degraded ecosystems and protection of natural habitats. Art. 8. Most importantly, states parties are to protect ecosystems and to regulate or manage biological resources important for the conservation of biological diversity whether they are within or without protected areas. The Convention also contains a provision intended to counter the widespread destruction of native species that can occur through the introduction of exotic species.

Sustainable use is a major theme of the Convention and is defined as “the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.” Art. 2. Parties agree to regulate or manage harvested biological resources, developing sustainable methods and minimizing adverse impacts on biological diversity. States must initiate research, training, and public education, as well as techniques like environmental impact assessment. Special emphasis is given to protecting and encouraging traditional cultural practices if compatible with sustainable use and to the adoption of incentives for the conservation and sustainable use of components of biological diversity.

The Convention reiterates the general principles of international environmental law, including responsibility for and redress of transfrontier damage (Arts. 3, 14), cooperation (Art. 5), access to information (Arts. 14, 17), and prevention. The specific development agenda of UNCED is also reflected in various articles that prescribe specific rules of identification and monitoring, access to genetic resources (Art. 15), access to and transfer of technology (Art. 16), and technical and scientific cooperation (Art. 18).

For the first time in a global conservation agreement, there is a legal relationship between the conservation obligations of developing countries and the financial obligations of developed countries. The latter group of countries is required to provide “new and additional financial resources” to a financial mechanism for use by developing countries. The Convention specifies that the funding is to be applied to meet the full incremental costs deriving from measures needed to implement the Convention’s obliga-

tions. There is explicit recognition that the implementation of obligations under the Convention is linked to and dependent upon adequate funding being supplied. In addition, implementation must take into account “the fact that economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties.”

Nearly all states adhere to the Convention. The Conference of the Parties has held regular sessions at which it has adopted important decisions and recommendations on environmental impact assessment, introduction of alien species, transboundary cooperation, and the involvement of local and indigenous communities in protecting biodiversity.

The question of access to biological resources has been particularly contested. The CBD asserts the rights of states over plant and animal genetic resources under their jurisdiction, creating a complex relationship of rights and duties. On the one hand, authority to determine access to genetic resources rests with the national governments and is subject to national legislation. Art. 15.1. On the other hand, each state party must endeavor to create conditions to facilitate access to genetic resources for environmentally sound uses by other parties and should not impose restrictions that run counter to the Convention’s objectives. When access is granted, it shall be on mutually agreed terms and be subject to prior informed consent by the party providing the genetic resource, unless that party determines otherwise. Permits may be required, and it is likely that contractual access agreements will become the primary method by which public and private entities gain access and negotiate a share of the benefits upon a payment of collection fees, royalties, or other form of benefit-sharing. Such arrangements will need to take into account the needs and rights of indigenous and local communities from whose land genetic resources or traditional technologies are acquired.

2. Other Biodiversity Treaties

Many other treaties mandate specific conservation measures. The Bonn Convention on the Conservation of Migratory Species of Wild Animals (June 23, 1979) constitutes a recognition that the conservation and efficient management of migratory species require concerted action by all states within whose national jurisdiction the species spend part of their lives and through which they transit. Legal measures must broadly address threats to habitats, excessive hunting along migration routes, and degradation of feeding sites.

The Convention provides a framework within which range states of migratory species take individual and cooperative action to conserve the species and their habitats. The preamble states that wild animals in their innumerable forms are an irreplaceable part of the earth’s natural system, which must be conserved for the good of mankind. Further, it states that each generation holds the resources of the earth for future generations

and has an obligation to ensure that this legacy is conserved and utilized wisely. Each party is to adopt strict protection measures for endangered migratory species, conclude multilateral agreements for the conservation and management of migratory species that have an unfavorable conservation status or would benefit significantly from international cooperation, and undertake joint research activities.

For purposes of the Convention, the term “migratory species” is defined as the entire population or any geographically separate part of the population of a species of wild animals that habitually and predictably cross one or more national jurisdictional boundaries. This obviously includes not only birds, but both land and sea mammals, reptiles, and fish.

Regional conventions and other legal instruments regulate biodiversity for a large part of the planet: the Americas, Africa, Western Europe, South-East Asia, and the Pacific. In the Americas, the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (Washington, Oct. 12, 1940), 161 UNTS 193, USTS 981, 56 Stat. 1374, was an advanced instrument containing the principal means of modern conservation but with weak international supervision. It refers to establishment of protected areas, protection of migratory and endangered species, monitoring and regulation of international trade in wild plants and animals. The Convention has suffered from insufficient implementation due to lack of an institutional structure, and, although it had great potential, it lacks current effectiveness.

The 1978 Treaty of Amazonian Cooperation, concluded in 1980 between Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela, aims to promote the harmonious development of Amazonian territories and to ensure that the joint actions of the parties produce equitable and mutually beneficial results and achieve “the preservation of the environment, and the conservation and rational utilization of the natural resources of those territories.” Its measures are limited to research and exchange of information.

Three subregional treaties have been adopted in Central America: the Convention on the Conservation of the Biodiversity and the Protection of Wilderness Areas in Central America (Managua, June 5, 1992), the Convention on the Management and Conservation of Natural Forest Ecosystems and Forest Plantation Development (Guatemala, Oct. 29, 1993), and the Agreement on the Mesoamerican Biological Corridor (1996).

In Africa, the General Assembly of the African Union adopted the Convention on Nature Protection (Maputo, July 11, 2003), the most modern and comprehensive of all agreements concerning natural resources. It covers all aspects of environmental conservation and resource management. The preamble proclaims the conservation of the global environment to be a common concern of humankind and the conservation of the African environment a primary concern of all Africans. States are responsible for protecting and conserving their environment and natural resources and for using them in a sustainable manner in order to satisfy human needs accord-

ing to the carrying capacity of the environment. The obligations of the parties are progressive. The Convention advocates preventive measures and the application of the precautionary principle “with due regard to ethical and traditional values as well as scientific knowledge in the interest of present and future generations.” Nature conservation and management form an important part of the text. Even outside conservation areas, species and genetic diversity of plants and animals, whether terrestrial, freshwater or marine, shall be maintained and enhanced, in particular by the conservation of their habitats within the framework of land-use planning and of sustainable development. Art. IX. Parties shall also take all necessary measures for the protection, conservation, sustainable use, and rehabilitation of the vegetation cover. Art. VIII. Environmental agreements also have been concluded in Africa at the subregional level, and some of these contain progressive enforcement measures.

In Europe, a Convention on the Conservation of European Wildlife and Natural Habitats was prepared within the Council of Europe (Bern, Sept. 19, 1979). It represented major progress compared to earlier regional efforts, if only because it established an institution charged with ensuring its functioning and implementation. It also created substantive obligations for the contracting parties instead of merely expressing goals and encouraging their fulfillment. Its fundamental purpose is to conserve wild flora and fauna and their natural habitats, “especially those species and habitats whose conservation requires the cooperation of several States.” Art. 1. States parties have an obligation, however, to conserve wild flora and fauna in all circumstances, whether the problems posed are transfrontier or not.

The Bern Convention, Art. 6, forbids the deliberate picking, collecting, cutting, or uprooting of protected plants, and in regard to protected wild animals prohibits:

- a) all forms of deliberate capture and keeping and deliberate killing;
- b) the deliberate damage to or destruction of breeding or resting sites;
- c) the deliberate disturbance of wild fauna, particularly during the period of breeding, rearing and hibernation, insofar as disturbance would be significant in relation to the objectives of this Convention;
- d) the deliberate destruction or taking of eggs from the wild or keeping these eggs even if empty;
- e) the possession of and internal trade in these animals, alive or dead, including stuffed animals and any readily recognizable part or derivative thereof, where this would contribute to the effectiveness of the provisions of this Article.

Exceptions can be granted to this general article, but the cases where they can be introduced are specified and strict.

Art. 2 provides that the contracting parties will take requisite measures to maintain the population of wild flora and fauna at “a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements and the needs of sub-species, varieties or forms at risk locally.” Contracting parties must take steps to promote national policies for the conservation of wild flora, fauna, and natural habitats, with particular attention to endangered and vulnerable species, as well as endangered habitats. Art. 3. A first step was thus taken towards conserving the world genetic heritage in natural sites and not in museums and laboratories. The inescapable links between the habitats, flora, and fauna are reflected in Art. 4, which calls for protecting the habitats of all wild species, whether endangered or not. It gives particular emphasis to those that are considered as needing special protection, listed in two Appendices.

In Asia and the Pacific region, the Apia Convention on the Conservation of Nature in the South Pacific (June 12, 1976) is modest both in its content and in its geographic scope. Its main focus is the creation of protected areas. Each contracting party shall, “to the extent that it is itself involved, encourage the creation of protected areas” to safeguard, along with existing protected areas, representative samples of natural ecosystems, important natural features, and regions or objects “of aesthetic interest or historic, cultural or scientific value.” Both endangered and migratory species are given special attention (Art. 5). However, the Convention leaves it to each state party to establish and maintain a list of indigenous species threatened with extinction. The species included in the lists are protected.

The ASEAN Convention on the Conservation of Nature and Natural Resources (Kuala Lumpur, July 9, 1985) contains substantial obligations in every domain where environmental problems can arise. It is one of the most complete nature protection agreements in existence, but it has not yet entered into force. Once it becomes law, the states parties agree to adopt the measures necessary to maintain essential ecological processes and life-support systems, to preserve genetic diversity, and ensure the sustainable utilization of harvested natural resources, in order to achieve sustainable development. Art. 2 of the Convention requires the contracting states to ensure that conservation and management of natural resources are treated as an integral part of development planning at all stages and at all levels. The Convention applies equally to plant and animal species. Art. 6, devoted to vegetation cover and forest resources and their roles in the ecosystems, requires controlling clearance, preventing fires and overgrazing, regulation of mining operations, creation of reserves, reforestation and afforestation, and the conservation of forests, particularly mangroves. Similarly, the protection of the air, soil, and water resources is viewed from the perspective of their functions in natural ecosystems. Arts. 7, 10. The regulation and control of water utilization includes maintaining systems supporting aquatic flora and fauna. Art. 8.

3. Treaties Addressing Specific Threats to Biodiversity

Five global conventions protect wildlife or protect species solely through habitat protection or through trade restrictions. "Habitat" means any area in the range of a species which contains suitable living conditions for that species." Certain instruments, such as the Oslo Convention on Polar Bears (Nov. 15, 1973), give habitat a more concrete definition by incorporating areas of hibernation and feeding, as well as migration routes.

A few conventions are entirely aimed at protecting the habitat of protected species, while in other treaties the protection of species of plants and animals is but one of the objectives in the creation of protected areas. Habitat protection was originally the exclusive objective of the 1971 Ramsar Convention on Wetlands of International Importance, whose original title added, "particularly as waterfowl habitat." Similarly, the 1982 Geneva Protocol Concerning Mediterranean Specially Protected Areas provides in Art. 3(2) that such areas are created with the aim of safeguarding genetic diversity of species as well as satisfactory population levels, areas of reproduction, and their habitats. In contrast, the UNESCO Convention concerning the World Cultural and Natural Heritage is not designed exclusively for protection of flora and fauna, although it permits the inscription on its international register of areas of principal interest as the habitat of specific species.

Numerous regional conventions also invite the contracting parties to establish protected areas, such as national parks or natural reserves in the framework of more comprehensive protective measures. The different conventions increasingly converge to protect endangered or vulnerable species by conserving their habitats, with consequences that include prohibition of takings and polluting activities.

Regulation of trade in specific species is a method of protection not based on a spatial concept of protection but on restricting overconsumption of exploited species. One of the most powerful motives for the taking of plant and animal species is income-production, especially in poor countries lacking other major resources. Trade in wildlife is mostly from southern to northern countries and is estimated to have a value of up to \$50 billion annually. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington, Mar. 3, 1973), to which the majority of states in the world are party, is the principal instrument in this regard.

The aim of CITES is to protect endangered species by banning trade in them and to regulate trade in other commercially exploited species in order to ensure sustainability and economic benefits for exporting countries. The conditions of export require a permit based upon an opinion of a national Scientific Authority that the export will not be detrimental to the survival of the species. The CITES controls apply to all trade in listed specimens, even to trade conducted between CITES parties and non-par-

ties. As a whole, the Washington Convention functions well, although few states have enacted the full panoply of national measures required to give effect to all aspects of the Convention.

Another set of instruments restricts a specific method of taking living resources, such as the utilization of driftnets in the marine environment. Several global and regional legal texts attempt to combat large scale pelagic driftnet fishing. At the beginning of the regulatory efforts, more than 1,000 fishing vessels used large-scale pelagic driftnets of up to 48 kilometers (30 miles), nets that were often referred to as “walls of death,” because they captured everything in their path. In late 1989, 21 countries adopted the International Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Wellington, Nov. 24, 1989). The Convention requires each party to take measures to prohibit the use of driftnets more than 2.5 kilometers long and the transshipment of driftnet catches. Each party may take more stringent measures against driftnet fishing activities, such as prohibiting (1) the landing of driftnet catches within its territory, (2) the processing of driftnet catches in facilities under its jurisdiction, or (3) the importing of fish or fish products caught by means of driftnets. States parties also may restrict port access and port servicing facilities for driftnet fishing vessels and prohibit the possession of driftnets on board any fishing vessel within areas under its fisheries jurisdiction. All parties undertake to collaborate in surveillance and enforcement and to consult on matters relating to driftnet fishing activities. Similarly, the EU Council of Fisheries Ministers agreed to ban driftnet fishing on the high seas by all vessels flying the flags of EU states as of January 1, 2002. Council Regulation 1239/98, June 8, 1998, amending Regulation 894/97, laying down certain technical measures for the conservation of fishery resources, 1998 O.J. (L 171), 1–4.

4. Agreements Concerning Specific Species

A large number of treaties aim at protecting specific animal species, such as polar bears, or at conserving groups of species, like whales, seals, and birds. The treaties often are concluded on a regional basis because of the localization of the species, but states that are not habitat states sometimes adhere to the agreements for reasons of principle.

Fishing agreements and those concerned with other marine life are among the most common treaties devoted to specific species. In recent years, marine biodiversity has become increasingly threatened due to pollution from land-based and other sources, overexploitation, the introduction of alien species, coastal development, global climate change, and ozone depletion. The problem of overfishing has received far more attention than the overall loss of marine biodiversity or protection of endangered components like marine mammals and coral reefs, probably because of the global importance of fisheries and the urgency of the threat to them.

According to the FAO, more than half of the world's commercial fish stocks are estimated to have reached their yield limit. The decreasing number of fish has led to conflicts between the approximately 70 coastal states and ten long-range fishing states competing for the resources. In fact, 20 countries account for 80 percent of the world marine catches, nearly all of which occurs in areas under national jurisdiction. A Report of the UN Secretary-General in March 2000 on Oceans and the Law of the Sea called illegal, unregulated, and unreported fishing one of the most severe problems facing global fisheries. Report of the Secretary-General, Oceans and the Law of the Sea: U.N.G.A. 55th Sess., UN Doc. A/55/61 (2000), at 26.

In 1999, scientists estimated that fish is the primary source of protein for close to 950 million people and is the source of employment for about one quarter of that number. Fish resources are a major component of international trade. In some developing countries, fish represent up to 80 percent of the total exports. From 1950 to 1970, fisheries production increased by approximately 6 percent annually, trebling from 18 to 56 million tons. During the 1970s, the rate of increase declined to about 2 percent and in the 1990s fell to zero. Declining catches have led to job losses and higher prices for fish.

The dependence of overexploited fishing resources on non-target species and ecosystems has led to the conclusion of other international legal instruments of broad scope, including within them new principles, norms, decision-making procedures, and institutional arrangements to address marine biodiversity generally, from bans on driftnet fishing to codes of conduct for responsible fishing.

The UN Convention on the Law of the Sea (Montego Bay, Dec. 10, 1982) contains important provisions relating to conservation of marine living resources. Its general rule affirms coastal state authority to ensure the conservation of biological resources in the zones over which it exercises jurisdiction, i.e., the territorial sea, the exclusive economic zone, and the continental shelf. UNCLOS, Arts. 21(1)(d), 56(1), 61–65, 73(1), and 77. The exclusive economic zone, because of its size and above all because of its objectives, is of primary importance in the conservation of the marine living resources. In this region, the coastal state has sovereign rights to explore and exploit, conserve and manage the natural resources, but it also has the duty to ensure, through proper conservation and management, that the maintenance of the living resources is not endangered by overexploitation. UNCLOS Art. 61 requires the coastal state to cooperate in appropriate cases with international organizations to achieve the goal of maintaining or restoring populations of harvested species at levels that can produce the maximum sustainable yield. An important innovation reflecting a broad ecological perspective is the requirement that the coastal state take into consideration the effects of its measures on species associated with or dependent upon harvested species, in order to maintain or

restore these populations above levels at which their reproduction may become seriously threatened.

The rules adopted by the coastal state to ensure the conservation and management of the marine living resources in its exclusive economic zone can be enforced through boarding, inspection, arrest, and judicial proceedings. However, the measures cannot include imprisonment or any form of corporal punishment. Art. 72.

Conservation of marine living resources may be seen, therefore, as a general obligation, in particular as concerns the high seas. Since no territorial jurisdiction can be exercised on the high seas because of the freedoms that exist in this area, all states have the obligation to take measures applicable to their nationals, which may be necessary for the conservation of the living resources of the high seas, and to cooperate with each other in this regard. Arts. 117–118. Measures must be designed, on the best scientific evidence available, to maintain or restore populations at levels that can produce the maximum sustainable yield, qualified by relevant environmental and economic factors. The interdependence of stocks must be taken into consideration in order not to threaten associated or dependent species. Art. 119.

Fisheries regimes have been created rapidly in recent years with growing recognition of the threats to sustainability. The conclusion of UNCLOS stimulated regional action according to fish stock. Fisheries treaties thus include conventions for the conservation of different species of fish in different regions

Like fish, other endangered species, such as marine turtles, marine mammals (including different species of cetaceans, such as whales), seals, polar bears, vicuna, bats, and numerous species of birds, have benefited from specific treaty protection. Important international attention has also been given to the rapid loss of the world's forests, the more so since forests also serve as sinks for greenhouse gases and produce oxygen for the planet. The ecological services of forests are difficult to value and to contrast with the revenues produced when trees are cut.

Finally, one of the long-standing but intensifying threats to biodiversity comes from the accidental or deliberate introduction of invasive or alien species into a new habitat. Some species, like the desert locust, are not alien, but periodically appear to decimate crops and other plants. Alien invasive species may travel through modern means of transportation and trade, in the ballast water or on the hull of ships or in the cargo of airplanes for example, to areas where native species have little or no resistance to them or ability to compete for resources. Invasive and alien species often reproduce rapidly and lack their usual predators, allowing them to transform entire ecosystems. Decision VI/23 of the Sixth Conference of the Parties to the Convention on Biological Diversity expands on Convention Art. 8(h) calls on states parties to “prevent the introduction

of, control or eradicate those alien species which threaten ecosystems, habitats or species.”

In sum, the legal methods to ensure conservation of wildlife have evolved significantly since the first international instruments addressed this matter. Regulation has progressed from establishing closed hunting and fishing seasons, through a general prohibition on taking specimens and habitat protection, to the complete management of populations of wild animals and plants. However, the older methods of conservation have not completely disappeared. Today, international agreements propose a wide variety of means addressed to public entities seeking to protect wild plants and animals, although many of the means concern only animals. In most cases, several techniques must be combined.

Based upon a number of national legislative measures, some international agreements prohibit certain means of killing or capturing specimens of wildlife. Here again, the Bern Convention appears to be the most complete and reflecting most generally accepted rules. As a whole, it prohibits utilizing non-selective means of killing and capture and means capable of causing local disappearance of or serious disturbance to populations of a species. A special Appendix lists means that are prohibited for mammals (snares, live animal decoys, tape recorders, electrical devices, explosives, nets, traps, poison, etc.) and for birds (snares, limes, hooks, explosives, nets traps, poisons).

Increasingly, efforts to protect wild fauna and flora are using a comprehensive integrated or ecosystem approach directed at such areas as flowing bodies of water, wetlands, drylands, or unfertilized grasslands. The integrated approach to nature protection is supported by international understanding of the threats to biodiversity. In some cases, various types of property “set-aside” or conservation measures are used to protect plants and animals. EC Directive 92/43 on the conservation of natural habitats and of wild fauna and flora specifically aims to protect biodiversity by conserving natural habitats. Directive on the Conservation of Natural Habitats of Wild Fauna and Flora, 92/43/EEC, 1992 O.J. (L 206), 7. It calls for a coherent European ecological network of special conservation areas, called Natura 2000. Each member state must contribute to the creation of Natura 2000 in proportion to the representation within its territory of natural habitat types and the habitats of species listed in annexes to the directive.

D. MARINE ENVIRONMENT

Marine waters cover over 70 percent of the planet’s surface area and a vast majority of the total volume of the earth that is known to sustain life. Despite the importance of the marine environment, human activities everywhere are depleting marine and coastal living resources and degrading ecosystems in sometimes irreversible ways. The oceans possess great natural capacity for self-purification, but there are limits to this process that

are being reached and exceeded as the amount of harmful substances flowing directly or indirectly into the seas has increased along with the growing world population and expanding industrialization. In fact, the major threats to the health, productivity, and biodiversity of the marine environment result from human activities that take place on land, in coastal areas, and even further inland. Erosion of soil carrying pesticides and fertilizers has created approximately 50 marine dead zones, one of the largest being off the mouth of the Mississippi River in the Gulf of Mexico.

The marine environment is also under threat, because the traditional uses of the sea have intensified and diversified. The sea has always played a particularly important role in the transport of products. This is still its principal role, and today the vast number and size of ships raise concerns about the heightened risk of marine pollution. Fish are increasingly showing signs of contamination and damage, including concentrations of carcinogens, tumors, wounds, and malformations, which render them unsuitable for consumption and which threaten their ability to reproduce.

Besides the intensification and transformation of traditional uses of the seas, new activities increase ocean pollution. Although exploitation of the seabed for the production of oil is of relatively recent origin, today nearly one-third of all oil comes from offshore oil drilling. The discovery of poly-metallic nodules on the ocean floor has not led to massive exploitation thus far, but the International Seabed Authority has approved the first exploration contracts. Tourism also plays an important role in recent uses of the sea. Although transoceanic liners almost disappeared with the development of mass air transport, pleasure cruises are increasingly popular and create numerous sources of pollution that are difficult to control. Treasure hunters seeking ancient wrecks and marine archeologists abound in shallower waters, particularly among fragile coral reefs. Finally, massive utilization of the sea as a dumping ground for waste means thousands of tons of matter that must be disposed of can be dumped by a single ship in one voyage.

International environmental law must respond to this evolution, despite two distinct but converging problems. First, while the oceans share homogeneous characteristics, such as ocean currents, salt, and contiguity, their geophysical situation differs widely in the various regions of the world. There are nearly enclosed seas, such as the Baltic and Mediterranean, which do not have the same enormous intermixing of waters from which other seas benefit. It is thought that the Mediterranean renewal is so slow that its waters are exchanged only once every century. The waters of the Baltic are also quite static, with 90 percent replacement only every 25 years. H. Velner, *Baltic Marine Environment Protection Commission*, in *COMPREHENSIVE SECURITY FOR THE BALTIC: AN ENVIRONMENTAL APPROACH* (A.J. WESTING ed., 1989). They are less able to absorb and diffuse pollution, although these two seas have among the highest known densities of maritime traffic and also suffer from exceptionally concentrated population

levels along their shores, with all the attendant pollution. It seems clear that the problem of maritime pollution requires measures be taken on both the regional and the global level, with local variation being resolved through appropriate specific regulations at the same time that universal norms are formulated.

Secondly, the origins of the pollutants that affect the marine environment differ greatly one from the other. They can be intentional, for example the dumping of wastes whose disposal is difficult or more expensive on land and the cleaning of oil tanker hulls on the high seas followed by discharge of the residue of oils into the ocean waters. Pollution also can be accidental, resulting from tanker grounding or loss of containers of toxic or dangerous products. It may be necessary to utilize various regulatory techniques to take into account these differences.

As a whole, international instruments concerning marine environmental pollution distinguish four categories of pollution: vessel-based pollution coming from normal utilization of the oceans; pollution arising from exploration or exploitation of the seabed; land-based pollution whether coming from direct discharges into the ocean or carried into it by rivers; and finally deliberate and large, mostly industrial, dumping of wastes. Pollution transported by air may be added, including that derived from incineration of wastes at sea or along the coast.

International responsibility for marine pollution is clearly recognized in principle (UNCLOS, Art. 235), but the development of more precise rules is necessary. In the meantime, compensation is assured by other means, primarily through internal legal proceedings, for damage caused by pollution of the marine environment.

Numerous standards prohibit or regulate deliberate or intentional pollution. To minimize accidental environmental harm, other measures must be taken, such as strict rules governing the construction of tankers, navigation, and the training of crews. In addition, marine environmental pollution due to accidents can only be combated through international cooperation. In this regard, a 1969 convention permits exceptional intervention on foreign-flag vessels¹ on the high seas in case of accidents that involve or threaten marine environmental pollution. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Brussels, Nov. 29, 1969). Part of the task of international law is to further develop international cooperation.

1. Historical Evolution

A rise in general environmental awareness, coupled with the 1967 *Torrey Canyon* tanker accident, which spilled over 100,000 tons of crude oil into

¹ The law of the sea normally restricts jurisdiction over ships on the high seas to the state of registration, whose flag the ship flies.

the English Channel causing black tides and damage to both the French and English coastlines, led states to address the problem of marine environmental pollution regionally and globally. The *Torrey Canyon* spill revealed the difficulty of resolving the numerous compensation claims and liability issues under then-existing law. As a result, the International Maritime Consultative Organization (IMCO) (now International Maritime Organization) (IMO) drafted two conventions in 1969, one concerning civil responsibility for oil pollution damage and the other relating to intervention on the high seas in cases of oil pollution casualties, supplemented in 1971 with adoption of a convention creating an international fund for compensation for oil pollution damage.

Before the end of 1972, a conference in London created a new global international instrument, the Convention on the Prevention of Marine Pollution by Dumping other Matter (Dec. 29, 1972). It is known as the London Dumping Convention. One year later, also in London, a conference convoked by IMCO (now IMO) adopted a treaty that aimed at all pollution caused by ships, the International Convention for the Prevention of Marine Pollution by Ships (London, Nov. 2, 1973), popularly known as MARPOL. The same year saw the beginning of the Third UN Conference on the Law of the Sea, whose work resulted in the UN Convention on the Law of the Sea (UNCLOS) (Montego Bay, Dec. 10, 1982). As of November 2006, 152 states were party to UNCLOS.

UNCLOS, whose provisions generally reflect customary international law, provides the overall legal framework for ocean activities. Its provisions are discussed in Sections D.2 and D.4. Its comprehensive regulation addresses the protection and preservation of the marine environment in Part XII. In addition, Art. 145 specifically aims at preventing pollution resulting from exploration and exploitation of the deep seabed. The Convention recognizes the competence of the coastal state to combat pollution in the territorial sea (Art. 21) and also proclaims its competence in the UNCLOS-created exclusive economic zone (Art. 56). On the other hand, UNCLOS contains no new substantive rules to combat pollution of the high seas, although there are new rules protecting marine living resources.

The law of marine environmental protection has also developed regionally, following the main directions of UNCLOS. States of different maritime regions of the Northern hemisphere, i.e., the Baltic Sea, North East Atlantic, and Black Sea, concluded general treaties on these waters.

The UN Environment Program also launched a program for “regional seas” aiming to create a comprehensive system of treaties and protocols for each targeted area. The earliest of these treaty systems concerns the Protection of the Mediterranean Sea against Pollution (Barcelona, Feb. 16, 1976). The main treaty is accompanied by two protocols, one the Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, the other the Protocol concerning

Cooperation in Combating Pollution of the Mediterranean Sea by Oil and other Harmful Substances in Cases of Emergency. Five additional protocols, subsequently concluded, relate to Pollution from Land-Based Sources (Athens, May 17, 1980), Mediterranean Specially Protected Areas (Apr. 3, 1982, replaced by a new protocol on the topic June 10, 1995), Pollution resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil (Madrid, Oct. 14, 1994), and Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (Izmir, Oct. 1, 1996). Taken together, more than 130 states today cooperate in UNEP's regional seas program.

The original Barcelona Convention was revised and amended by an agreement of June 10, 1996, which expanded its scope to coastal areas, integrated into it principles, such as the precautionary principle, the polluter-pays principle, and public information, and introduced into it the obligation to prepare environmental impact assessments, as well as to adopt integrated management for coastal areas.

Other regional seas are similarly regulated by UNEP-sponsored treaty systems: the Persian Gulf, West and Central Africa, the South-East Pacific, the Gulf of Aden and the Red Sea, the Caribbean, the Indian Ocean and East Africa, and the South Pacific. In early 2002, eight countries of the Americas adopted the latest treaty for a regional sea. The Antigua Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Feb. 18, 2002) contains several innovations responding to the main problems that arise in protecting the marine environment. It includes the precautionary and polluter pays principles, environmental impact assessment procedures, participation of local authorities and civil society in decisions that affect the marine environment, and provision of information to civil society and local authorities on the status of the marine environment of the region. Art. 3(6). Its new elements include providing for integrated development and management of coastal areas and shared water basins and adopting an ecosystem approach to fisheries management. Art. 10(2)(e). Also, the core of the Convention advocates measures to prevent, reduce, control, and remedy different forms of pollution, as well as measures to counter biophysical modifications of the marine environment, including alteration and destruction of habitats. It expresses the need to identify and protect endangered species of flora and fauna and contains a special provision on the erosion of coastal areas. Detailed measures are also foreseen for emergency situations.

2. UNCLOS: Rights and Duties of States in Maritime Areas

The environmental provisions of UNCLOS cover the three major sources of marine pollution: land based sources, vessel source pollution, and atmospheric pollution. The provisions apply to all ocean surfaces, not only the

high seas, but also to areas under the jurisdiction of coastal states. They also seek to combat marine pollution by various preventive measures, including the duty to notify states of any imminent danger of pollution, to develop contingency plans for responding to incidents, to monitor the risks of pollution, and to assess potential effects of planned activities that may cause substantial pollution or significant changes in the marine environment and communicate such assessments. UNCLOS Art. 192 proclaims that states have a general obligation to protect and preserve the marine environment. Clauses relating to the preservation of marine biological resources are contained in the sections of the Convention regulating each of the established marine zones.

International cooperation, both regionally and globally, is presented as an obligation, explicitly with the aim of formulating and elaborating international rules, standards, and “recommended practices and procedures.” Art. 197. Specific provisions govern cooperation in emergencies. Arts. 198–99. States also are required to monitor continuously the risks or effects of pollution. In particular, they must “keep under surveillance” the effects of any activities that they permit or in which they engage, in order to determine whether these activities are likely to pollute the marine environment. Art. 204. The results obtained from such surveillance must be communicated to international organizations, which should make them available to all states. Art. 205. In addition, states should assess the potential effects of any activities that may cause substantial pollution and communicate the results of such assessments. Art. 206. As a final element in the framework of international cooperation, the Convention foresees assistance to developing states in the fields of science and technology and preferential treatment for these states by international organizations. Arts. 202–203.

The Convention identifies three states competent to exercise jurisdiction over matters of marine pollution: flag states, port states, and coastal states. One aspect common to the jurisdiction of all three is the obligation to take into account or enact and enforce internationally agreed rules and standards. States “shall adopt laws and regulations and take other measures necessary to implement applicable international rules and standards established through competent international organizations or diplomatic conference to prevent and control pollution of the marine environment” from various sources. Arts. 213–214, 216–220, 222.

a. Flag State Jurisdiction

Pursuant to the detailed provisions of UNCLOS Art. 217, states must ensure that ships under their jurisdiction and control comply with applicable international rules and standards and with flag state laws and regulations adopted in accordance with the Convention. They also shall take appropriate measures to ensure that ships they register or that fly their flag are prohibited from sailing unless they are in compliance with interna-

tional rules and standards. Ships shall carry any certificates required by international law and be inspected periodically. In case of any violation, the flag state shall investigate and where appropriate institute proceedings regardless of where the violation or pollution occurred. Penalties must be adequate in severity to discourage violations wherever they occur.

b. Port State Jurisdiction

Port states have jurisdiction, confirmed in Art. 218, in cases where ships voluntarily enter a port or offshore terminal. The state may undertake investigations and, where the evidence warrants, institute proceedings against the ship for any discharge on the high seas in violation of applicable international rules and standards. For discharges in the internal waters, territorial sea, or exclusive economic zone of another state, the port state may open a proceeding only if requested by the other state or if the violation has caused or is likely to cause pollution of its own waters. Port states should respond to requests from any state for investigation of pollution caused in the requesting state's waters, as well as to requests from the flag state. Finally, the port state may prevent from sailing any foreign ships violating international rules and standards relating to seaworthiness that could thereby threaten damage to the environment, until the violations have been cured.

c. Coastal State Jurisdiction

Coastal states are granted extensive jurisdiction by Art. 220 to combat pollution of the marine environment in their territorial seas and exclusive economic zones, supplementing the general grant of coastal state jurisdiction over these zones proclaimed by Art. 21(1) and Art. 56(1)(b)(iii). The legislative power of the coastal state to combat pollution by ships is affirmed for the territorial sea by Art. 211(4) and for the exclusive economic zone by Art. 211(5). The scope of authority over the two zones differs. For the more distant exclusive economic zone, the coastal state must adopt laws and regulations that conform to and give effect to generally accepted international rules and standards. No such limitation appears on the jurisdiction of the coastal state for the more proximate 12-mile territorial sea, except that laws and regulations governing the territorial sea must not hamper innocent passage of foreign vessels. Art. 211(4).

If the coastal state has clear grounds for believing that a violation has resulted in a substantial discharge causing or threatening significant pollution to the marine environment, Art. 220(5) permits the state to undertake physical inspection of the vessel. If the discharge causes major damage or threat of major damage to the coastline or related interests of the coastal state, the state may institute proceedings, including detention of the ves-

sel, in accordance with its laws. The vessel can be authorized to proceed, however, if there exist procedures foreseen in advance to assure compliance by a bond or other appropriate financial security. Art. 220(7).

The Convention also seeks to guarantee the interests of the flag state in cases where the coastal state institutes proceedings. Art. 231 requires that the measures taken must be reported to the flag state.

In its rules on liability, UNCLOS distinguishes between civil, criminal, and international liability. As to civil liability, states must ensure the availability within their legal systems of procedures for prompt and adequate compensation or other relief in respect of damage caused by pollution by natural or juridical persons under their jurisdiction, being understood that states are to cooperate in the implementation and further development of international law in this field. Criminal liability is foreseen in rules that distinguish the place of the harm: only monetary penalties may be imposed on foreign vessels for violations outside the territorial sea, but within the territorial sea criminal sanctions are permitted for willful and serious acts of pollution. Art. 230.

International responsibility is governed by Art. 235, which affirms that states shall be liable in accordance with international law for failure to fulfill their international obligations concerning the protection and preservation of the marine environment. In addition, states are liable for damage or loss attributable to them arising from unlawful or excessive measures taken to apply the provisions of the Convention relating to protection of the marine environment.

Finally, UNCLOS contains concessions to state sovereignty. By the terms of Art. 236, the provisions of the Convention regarding the protection and preservation of the marine environment do not apply to any warship, naval auxiliary, or other vessels or aircraft being used by the government in non-commercial service.

3. Comprehensive Regional Treaties

Marine environmental law has evolved towards comprehensive regulation. The 1992 Conference of Rio de Janeiro built on the norms contained in UNCLOS, with Chapter 17 of Agenda 21 attempting an integrated approach in its reference to all matters that concern the sea. The formulation of the title, *Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas and coastal areas and the protection, rational use and development of their living resources*, announced the three main areas of interest: the sea itself, the coastal areas, and living resources.

Several important regional agreements were concluded around the time of the Rio Conference. Outside the UNEP regional seas program, the Convention for the Protection of the Marine Environment in the North-East Atlantic (Sept. 22, 1992) replaced two earlier agreements, following a 1990 decision of the states parties. The other significant new conventions

protect the Baltic Sea against pollution (Apr. 9, 1992), replacing a 1974 instrument, and the Black Sea (Apr. 22, 1992). The first of the three conventions is of particular importance, however, not only because of the large area covered, but also because it incorporates many modern trends of international environmental law.

The Convention on the North-East Atlantic (Paris, Sept. 22, 1992), proclaims two important principles in its preamble. The first recognizes the inherent value of the marine environment of the North-East Atlantic, implying that it should be protected independently of its direct utility for the contracting states. The second principle, recognizes that UNCLOS Part XII contains norms of customary international law.

The body of the Convention outlines the obligations of contracting parties regarding pollution from land-based and offshore sources, dumping, incineration, installations, and pipelines from which substances or energy reach the maritime area. Two land-locked countries, Luxembourg and Switzerland, have become parties to the Convention, taking into account their contribution to the pollution, carried by the Rhine River to the North Sea.

The Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, Apr. 9, 1992) is similar to the treaty on the North-East Atlantic: it concerns all forms of pollution; it announces the principles of precaution (Art. 3(2)) and polluter pays (Art. 3(4)) in comparable terms; it prescribes the use of the Best Environmental Technology and of the Best Environmental Practice (Art. 3(3)) defining them, as well as the criteria for their use (Annex II). It also provides that information shall be made available to the public, but limits accessible information to permits issued, the conditions required to be met, the results of water and effluent sampling, and water quality objectives. The means of obtaining such information are restricted to reasonable times, with reasonable facilities, on payment of reasonable charges. Art. 17. Information related to intellectual property including industrial and commercial secrecy, national security, and confidential personal data may be withheld. Art. 18.

The 1992 Baltic Sea Convention contains several innovations. It reflects the importance of the catchment area of this sea by requiring each contracting party to take measures relevant to combating pollution from land-based sources in the catchment area (Art. 6) and, in particular, to ban from this area listed substances or groups of substances.

Six coastal states adopted the Convention on the Protection of the Black Sea against Pollution (Bucharest, Apr. 21, 1992). It follows the pattern established by the UNEP regional seas program (a framework convention completed by three protocols) without being integrated into that program. The general undertaking is to prevent, reduce, and control pollution in order to protect and preserve the marine environment of the Black Sea. The area of application includes the territorial sea and the exclusive eco-

conomic zone of each contracting party in the Black Sea (Art. 1), taking into account the adverse effects of pollution of their internal waters on the marine environment (Art. 5(1)). The Convention's principles to protect the Black Sea marine environment against pollution and polluting activities derive in large part from the rules of UNCLOS and comparable regional sea treaties. Arts. 6–12.

In sum, maritime pollution agreements increasingly show uniform patterns based upon UNCLOS. The primary concerns, revealed by a comparison of their provisions, are accidental pollution and prevention of pollution at source, including land-locked states through which water-courses flow that may carry pollution to maritime areas. The result is a holistic approach to maritime pollution linked to a more general integrated approach to environmental protection.

4. Regulating Sources of Pollution

a. Vessel Source Pollution

Certain long-standing and formerly accepted practices on the part of maritime vessels are among the main sources of marine pollution: dumping of wastes in the ocean, the discharge of various forms of oil, rinsing of tanker containers, and the release of sea water serving as ballast in empty tankers. When accidental pollution is added, coming from grounded oil tankers or the loss of cargoes containing dangerous substances, the result is an estimated annual discharge of roughly 1.6 million tons of oil by shipping.

UNCLOS establishes the general framework of international norms concerning this problem in Arts. 194(3)(b), 211, and 217–221. The provision first cited summarizes the problem, providing that the measures taken to enforce the Convention should include those designed to minimize to the fullest possible extent “pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels.”

Art. 211 entirely concerns vessel-source pollution. It reaffirms the legislative mandate and obligation of states to prevent, reduce, and control pollution of the marine environment. States also should promote the adoption, as appropriate, of routing systems designed to minimize the threat of accidents which might cause pollution.

The various provisions of UNCLOS relating to jurisdiction over violations of environmental norms by vessels are supplemented by a global convention and by several regional seas conventions. The general instrument, the International Convention for the Prevention of Pollution by Ships (MARPOL, 1973/1978) has as its objective “the complete elimination of intentional pollution of the marine environment by oil and other

harmful substances and the minimization of accidental discharge of such substances.” It applies to ships, the term being defined in Art. 2(4) as a vessel of any type whatsoever operating in the marine environment, including hydrofoil boats, air-cushion vehicles, submersibles, floating craft, and fixed or floating platforms. Pollution itself is not defined, but its elements are found in the definition of discharge. This term means any release from a ship, whatever its cause, including escape, disposal, spilling, leaking, pumping, emitting, or emptying. Art. 2(3). Dumping is excluded, however, as is the release of harmful substances directly arising from the exploration, exploitation, and processing of seabed mineral resources or legitimate scientific research into pollution abatement or control. Art. 2(3)(b). Art. 3(3) of the Convention also excludes government, non-commercial vessels from its coverage, in language identical to that found in the later-adopted UNCLOS.

Amendments to MARPOL 73/78, adopted in 1992 require the application of the double hull or equivalent design standards to existing single hull oil tankers when they reach a certain age. New rules, adopted April 27, 2001, provide for an accelerated phasing-out scheme for single hull oil tankers. The EU, seriously concerned by shipping accidents involving oil tankers and the associated pollution of its coast-lines, decided to support the IMO actions by upgrading and/or phasing out existing ships. Regulation No. 417/2002, Feb. 18, 2002, 2002 O.J. (L 64).

Further measures to combat vessel source pollution were adopted by the IMO on October 5, 2001, when it concluded the International Convention on the Control of Harmful Anti-Fouling Systems. This Convention aims to protect the marine environment from toxic paint or other harmful means of preventing marine organisms from attaching to ship’s hulls. Preventing the encrustation of ship’s hulls with marine life, such as barnacles, is necessary to ensure that ships can move smoothly and quickly through the water. Such encrustation or fouling will slow down the ship and cause it to use more fuel, thereby causing both commercial and environmental problems. The primary obligation of states parties to the Convention is to prohibit or restrict the use of the harmful anti-fouling systems listed in Annex I, which were leaching into the water and causing serious harm to marine life and possibly to humans eating affected seafood.

Safety at sea, especially with regard to ships carrying hazardous cargoes, has become a major topic within the IMO. In January 2001, amendments to the IMO’s 1974 SOLAS Convention made mandatory an International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium, and High-Legal Radioactive Waste on Board Ships. Its provisions include shipboard emergency plans, notification in the event of an incident, training, cargo securing arrangements, and damage stability. On a related topic, the pressure of public opinion has led to significant progress in proscribing the dumping of radioactive wastes. The 1972 London Convention, Annex I, enumerates those substances for which

dumping is prohibited and includes “high-level radio-active wastes or other high-level radio-active matter, defined on public health, biological or other grounds, by the competent international body in this field, at present the International Atomic Energy Agency, as unsuitable for dumping at sea.” In 1977, the International Agency for Atomic Energy itself established a multilateral mechanism for consultation and monitoring of dumping of radioactive wastes at sea. Eventually, the IMO member states prohibited all dumping of radioactive wastes.

Regionally, the 1974 Baltic Sea Convention forbid any dumping not authorized by Annex V. The Annex enumerated limited exceptions to the general prohibition on dumping and did not include radioactive wastes among them. The 1976 Protocol Additional to the Barcelona Convention relating to the Mediterranean Sea also forbid dumping of “wastes and other matters highly, partly, or slightly radioactive.” Art. IV and Annex I, No. 7. Finally, Art. 3(3) of the Convention for the Protection of the North-East Atlantic explicitly prohibits the dumping of low- and intermediate-level radioactive substances, including wastes.

b. Exploration and Exploitation of the Seabed

Paralleling other provisions relating to marine pollution, UNCLOS provides in Art. 194(3)(c) that states should take measures individually or jointly to minimize to the fullest possible extent:

pollution from installations and devices used in exploration or exploitation of the natural resources of the sea-bed and sub-soil, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices.

Other provisions of the Convention distinguish between pollution resulting from activities taking place on the seabed of the high seas (declared to be the common heritage of mankind) and those resulting from activities relating to underwater areas falling under national jurisdiction. The relevant principles for the high seas area are contained in Art. 145. Art. 145 reads: “Necessary measures shall be taken in accordance with this Convention with respect to activities in the Area to ensure effective protection for the marine environment from harmful effects which may arise from such activities.”

Finally, the 2002 UNESCO Convention on the Protection of the Underwater Cultural Heritage, 41 ILM 37 (2002), aims to protect the historical and archaeological resources represented by shipwrecks and other human artifacts on the sea floor. In general, the Convention requires that activities directed at underwater cultural heritage be conducted in conformity

with an Annex containing rules and standards for underwater archaeology. Parties to the Convention must regulate the activities of their nationals and flagged vessels. The Convention itself has a strong preference for *in situ* conservation and requires efforts to prevent trade in illegally taken artifacts. Part II of the Rules requires that a project design be developed and submitted to the appropriate authorities prior to any activity directed at underwater cultural heritage and mandates that all activities be conducted in conformity with the project design. Rule 10 specifies that the project design include, *inter alia*, an environmental policy, while Rule 29 adds the rather weak statement that the environmental policy shall be adequate “to ensure that the seabed and marine life are not unduly disturbed.”

c. Land-Based Pollution

Land-based pollution can be defined as marine pollution due to discharges by coastal establishments or coming from any other source situated on land or artificial structures, including pollution transported by rivers into the sea. Approximately 70 percent of marine pollution comes directly from land-based sources. Land-based pollution is particularly severe in heavily populated coastal regions, as well as in regions where seasonal tourism may greatly increase the number of inhabitants.

The diversity of origins of land-based pollution makes it difficult to combat. Such pollution can occur directly, by dumping or discharges along the coast, or indirectly, by the intermediary of rivers or streams or subterranean waters. Applicable rules should, in principle, address all waters that flow into the sea, thus governing the entire aquatic environment. As such, in addition to national regulations forbidding discharge or requiring prior authorization of certain discharges, cooperation between states plays a great role, notably in establishing programs to progressively reduce pollution throughout an entire water basin.

UNCLOS regulates land-based pollution by the methods it applies to other pollution sources. Article 194 provides that states should take the necessary measures tending to limit as much as possible “the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere or by dumping.” Art. 207 provides that states shall adopt laws and regulations, as well as all other measures that may be necessary to prevent, reduce, and control this pollution. Art. 213 requires states to ensure their application. Many rivers carry pollution into the sea, and it is thus useful to add international treaties protecting fresh watercourses against pollution to this summary. The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses, confirms in Art. 23 that “[w]atercourse States shall, individually and, where appropriate, in cooperation with other States, take all measures with respect to an international watercourse that are necessary to protect and preserve the marine

environment, including estuaries, taking into account generally accepted international rules and standards.”

Apart from these texts, existing conventional sources regulating land-based pollution are exclusively regional. All regional seas treaties proclaim the principle of combating land-based pollution. The most precise regulations are those for the North-East Atlantic, the Baltic, the Mediterranean, and the South-East Pacific. The parties generally undertake to eliminate pollution deriving from land-based sources and activities, in particular to phase out inputs of substances that are toxic, persistent, and liable to bioaccumulate. Some of them list different sectors of activities, including energy production, petroleum refining, animal husbandry, and tourism, as well as characteristics of polluting substances (e.g., persistence, health effects and risks, effects on the smell, color, transparency, or other characteristics of sea water), and categories of hazardous substances, such as organohalogen compounds and substances, heavy metal, and biocides.

d. Emergencies

Emergencies can be defined as incidents where the presence or danger of hydrocarbons or other dangerous polluting substances constitutes a serious and imminent threat to the coasts or related interests of a state. In part due to the harm caused by the tankers *Torrey Canyon*, *Amoco Cadiz*, and *Exxon Valdez*, this is one of the most developed parts of international law relating to marine pollution. On the global level, it is governed by general principles set out in UNCLOS Arts. 189, 204 and 211(7) and by the International Convention on Oil Pollution Preparedness, Response and Cooperation (London, Nov. 30, 1990), elaborated in the framework of the International Maritime Organization. Before their conclusion, only regional instruments handled this matter.

The main obligations of the parties to the 1990 London Convention are to take, individually or jointly, all appropriate measures to prepare for and respond to an oil pollution incident. Art. 1. The Convention provides for measures in two stages. Preparedness includes setting up national and regional systems. This means designating competent authorities with responsibility for oil pollution response and operational contact points, as well as establishing authorities entitled to act on behalf of the state to request assistance or to render any requested assistance. National contingency plans shall be prepared and adequate oil spill control equipment made available. Relevant personnel shall be trained and detailed plans and communication capabilities established. Art. 6. Each ship entitled to fly the flag of a contracting party must have a shipboard oil pollution emergency plan, which can be inspected while in a port or at an offshore terminal under the jurisdiction of a party. All offshore units, sea ports, and oil handling facilities must also have such plans. Art. 3. The parties shall cooperate by providing advisory services, technical support and equipment,

administrative and other facilities, and by promoting research and relevant technical activities. Arts. 8 and 9. The London Convention was complemented on March 15, 2000, by a Protocol on Preparedness, Response and Cooperation to Pollution by Hazardous and Noxious Substances.

In the regional context, eight protocols additional are attached to UNEP-sponsored regional seas conventions. Generally speaking, the provisions relating to emergencies caused by oil pollution fall into three categories. One part aims at organizing advance cooperation, before the existence of an emergency situation. A second part becomes applicable when an emergency arises and concerns the actions that must be taken. Finally, most of the instruments contain institutional clauses, providing either for the creation of a mutual aid center among the states parties or for periodic meetings of the states parties, or both.

The fundamental requirement is that states maintain the ability to react efficiently to emergencies. Art. 2(2) of the Kuwait Protocol provides a good example:

The Contracting States shall endeavor to maintain and promote, either individually or through bilateral or multilateral cooperation, their contingency plans and means for combating pollution in the Sea Area by oil and other harmful substances. These means shall include, in particular, available equipment, ships, aircraft and manpower prepared for operations in cases of emergency.

Initial obligations include a requirement to transmit to other states parties the information necessary to respond to any potential action—i.e., information regarding national authorities responsible for combating pollution, including their structure and operation, and information designating the authorities who should be notified concerning marine pollution and who would implement measures of assistance between parties. The treaties additionally often require that states parties provide each other with copies of their laws, regulations, and other legal instruments relating generally to combating pollution of the sea by hydrocarbons and other harmful substances.

One of the most important tasks among the anticipatory measures is assuring that communications will function if an emergency arises. Art. 7 of the Barcelona Protocol reflects this need: “The Parties undertake to coordinate the utilization of the means of communication at their disposal in order to ensure, with the necessary speed and reliability, the reception, transmission and dissemination of all reports and urgent information which relate to the occurrences and situations referred to in Article 1.”

The most reliable means of alerting states in case of major marine environmental pollution is to exercise systematic monitoring. Art. 204 of UNCLOS summarizes this:

1. States shall, consistent with the rights of other States, endeavor, as far as practicable, directly or through the competent international organizations, to observe, measure, evaluate and analyze, by recognized scientific methods, the risks or effects of pollution of the marine environment.
2. In particular, States shall keep under surveillance the effects of any activities which they permit or in which they engage in order to determine whether these activities are likely to pollute the marine environment.

A number of regional treaties provide for the organization of ocean monitoring to detect pollution.

UNCLOS Art. 199 invites states to jointly develop and promote contingency plans for responding to pollution incidents in the marine environment. Several protocols concerning regional seas similarly provide for the preparation on the national level of contingency plans, and some require that these plans be communicated to other states parties.

Another anticipatory measure on the international level is the establishment of mutual aid centers in case of emergency at sea as provided for in several regional protocols. Art. 3 of the Kuwait Protocol has the most complete provision in this regard, granting numerous functions to its regional Marine Emergency Mutual Aid Center: gathering and disseminating information, assisting states parties in developing laws and regulations, preparing marine emergency contingency plans, establishing procedures for transport of personnel, equipment, and materials, transmitting reports concerning marine emergencies, and promoting and developing training programs for combating pollution. In addition, in emergency situations, the Center must be immediately informed and transmit this information to states parties as soon as possible.

The first task of states that learn of an emergency at sea is to inform the states exposed to it, as well as any competent international organizations. UNCLOS, Arts. 198, 211(7). This general obligation is reaffirmed and detailed in all the instruments especially concerned with international cooperation in case of emergencies. Thus, information should be addressed without delay to the competent authorities of any state that could be affected by the pollution. Moreover, according to the terms of the Barcelona Protocol, the maritime authorities of the states parties should instruct the captains of vessels flying their flag and aircraft pilots registered on their territory to signal to a state participating in the regional center, by the most rapid and adequate means, information regarding all accidents causing or likely to cause pollution of the sea by oil or other harmful substances. They must also provide notice of the presence, characteristics, and extent of spillage of such substances observed at sea that are likely to present a serious and imminent threat to the marine environment or to the coast or related interests of one or more states parties.

Art. 8(1). The information thus received is communicated to other states susceptible of being affected by the pollution, either directly by the state that received the information or by the regional center. Art. 8(2).

An Annex to the Protocol sets out the precise contents of the report to be made pursuant to Art. 8. Each report must contain, as far as possible, the identification of the source of pollution, the geographic position, time and date of the occurrence, the prevailing wind and sea conditions, relevant details concerning the ship, and a clear indication or description of the harmful substances involved.

The states also have financial and other substantive obligations. They must not only observe and notify of polluting incidents, but intervene. In case of a release or loss overboard of harmful substances in packages, freight containers, portable tanks, or road and rail tank wagons, they are mandated to cooperate to salvage and recover such substances in order to reduce the danger of pollution of the marine environment. The principal types of assistance required by the different regional instruments are furnishing of personnel, material, and equipment, as well as means of monitoring and control, and, second, facilitating the transfer of personnel, material, and equipment into, out of, and through the territories of the contracting states.

Finally, as noted at footnote 1 above, vessels on the high seas traditionally have been under the sole jurisdiction of the state whose flag they fly. In case of an accident causing pollution, only the flag state could intervene, even if it was a question of taking indispensable measures to stop the pollution. Following the 1967 *Torrey Canyon* catastrophe, it was apparent that the rule needed to be changed. Soon after the accident, IMO adopted the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Brussels, Nov. 29, 1969). It establishes that each of the states parties can take such measures on the high seas as may be necessary "to prevent, mitigate or eliminate grave and imminent danger to their coastline or related interests from pollution or threat of pollution of the sea by oil, following a casualty or acts related to such a casualty, which may reasonably be expected to result in major harmful consequences." In 1973, the provisions of this Convention were extended by a protocol, to cover substances other than oil.

E. HAZARDOUS SUBSTANCES AND WASTES

Human activities introducing hazardous or toxic substances into the environment may cause irremediable harm to living resources or ecological processes. Toxic substances generally do not return to their original state, at least in the short term, and thus may accumulate and produce synergistic effects with other substances, leading to irreversible harm. The longevity of some radioactive substances, for example, can be measured

in thousands or millions of years. The environmental impacts of utilizing such radioactive materials are thus practically irreversible.

From the end of the 1970s, rules increasingly regulated substances and human activities that produce or can produce harmful environmental consequences and that transfer from one sector to another. “Beginning of the pipeline” regulations addressed known hazardous and toxic products and wastes, radioactivity and nuclear wastes, and dangerous industrial and other activities. At the beginning of the 1990s, formulation of the precautionary principle began to address the uncertain risks of long-term or irreversible harm.

The production and utilization of chemical substances in the world have undergone unprecedented growth in the course of the past half century. At least 75,000 different chemicals are used in pesticides, pharmaceuticals, plastics, and other products. LESTER BROWN ET AL, *VITAL SIGNS* 130 (2000). Although it is difficult to obtain exact figures, chemical substances, including pesticides and fertilizers, represent about 10 percent of world trade, amounting to approximately \$18 billion in annual sales. Over 10,000 organochlorines are currently in commerce, used to make plastics, solvents, and disinfectants, refine petroleum, bleach pulp and paper, treat wastewater, and for dry cleaning. Each year 1,000 to 2,000 new products arrive on the market, without, in all cases, being tested or evaluated for their potentially harmful effects.

The human body on average contains some 500 chemicals that did not exist before 1920, many of them persistent organic pollutants and endocrine disruptors. Although some scientific testing has been done on the direct effects on human health, little research exists on the impact on plant life, soil, or other environmental sectors. The long-term consequences of many of the substances, alone or in combination, are unknown, but short-term harm is increasing: incidents of pesticide poisonings have doubled approximately every decade since the 1940s. WORLD HEALTH ORGANIZATION, *PUBLIC HEALTH IMPACT OF PESTICIDES USED IN AGRICULTURE* 28–29 (1990). Some substances travel long distances and affect populations who have never sought access to or used the products containing them. The Inuit of the Canadian Arctic, for example, have high concentrations of PCBs in their bodies.

1. Chemicals

International instruments devoted to hazardous substances have been adopted mostly since the second half of the 1980s, although the regulation of toxic or dangerous products appeared earlier and continues to appear in instruments addressing sectoral problems, such as rules relating to discharges into the marine environment and inland waters. All regulation of hazardous products must take into account their production, trade (including transportation), use, and elimination.

The potential effects of chemical substances on humans and the environment, including the long-term risks, should be evaluated before and during production. A major step in the control of hazardous chemicals occurred when 154 states and the European Union adopted the Stockholm Convention on Persistent Organic Pollutants (POPs, May 22, 2001). POPs possess toxic properties, resist decay, bioaccumulate, and are transported through air, water, and with migratory species across international boundaries, where they accumulate in terrestrial and aquatic ecosystems. They create risks to health, especially in developing countries and the polar ecosystems. Using the precautionary approach and advocating the polluter pays principle, the Convention insists on the responsibility of POPs' manufacturers to reduce adverse effects caused by their products and to provide information to users, governments, and the public at large on the hazardous properties of these chemicals.

The Convention makes a distinction between releases from intentional production and use (Arts. 3 and 4) and from unintentional production (Art. 5). The first category of chemicals, listed in Annex A, includes certain insecticides and PCBs. Each party shall prohibit and/or take the legal and administrative measures to eliminate their production and use and regulate their import and export. Each party also shall take measures concerning the unintentional production of the chemicals listed in Annex C (primarily PCBs and dioxins), such as developing and implementing an Action Plan designed to identify, characterize, and address their release by using the best available techniques and best environmental practices. Art. 6 suggests measures to reduce or eliminate releases from stockpiles and wastes, such as identification of stockpiles and the adoption of appropriate measures so that such wastes, including products and articles becoming wastes, are handled, collected, transported, and stored in an environmentally sound manner and finally disposed in such a way that the POP content is destroyed or irreversibly transformed so that it represents no environmental danger.

The importance of the POPs Convention lies in the fact that it imposes a global ban on a wide range of toxic and environmentally hazardous chemicals, a ban that could be extended to other materials.

Specific international conventions regulate the transport of hazardous substances according to the different means of transport.² The require-

² See, e.g., European Agreement Concerning the International Carriage of Dangerous Goods by Road (1957); Convention Concerning International Carriage by Rail (1924) and its Annex; the Regulations Concerning the International Carriage of Dangerous Goods by Rail, 1924/1985; International Convention for Safety at of Human Life at Sea (SOLAS, Nov. 1, 1974); Convention on Liability and Compensation, for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (May 3, 1996); Convention on International Civil Aviation (1944), Annex 18; and Technical Instructions for the Safe Transport of

ments of these agreements are often highly technical and focus on packaging, handling, insurance, and liability. More generally, in 1985, the FAO adopted the first International Code of Conduct on the Distribution and Use of Pesticides to reduce the hazards associated with their use. UN Doc. M/R8130, E/8.86/1/5000 (1986). The Code established voluntary standards for countries without existing pesticide regulation. It allocated shared responsibility among government, industry, and the public. In November 1989, the FAO amended the Code to adopt the principle of prior informed consent (PIC). Under the PIC provision, a pesticide that is banned or severely restricted in an exporting country, because of its threat to human health or the environment, should not be shipped to an importing country over that country's objection. It requires that relevant information be provided each country so that it can determine the risks and benefits associated with the chemical. Prior informed consent has since become increasingly required for trade in hazardous substances and products.

In 1998, the FAO sponsored adoption of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (PIC Convention, Sept. 10, 1998), incorporating the various voluntary arrangements into a legally binding instrument. The PIC Convention relies in large part on private actors to ensure that information on chemical and pesticide hazards is made available to the public. Each party is to require that exported Annex III chemicals, as well as chemicals banned or severely restricted in its territory, are subject to labeling requirements that ensure the provision of information about risks and/or hazards to human health or the environment, taking into account relevant international standards. The Convention thus implicitly places the primary duty to provide information on the manufacturer or packager of the export. Art. 15, which concerns implementation, requires each state party to ensure, to the extent practicable, that the public has appropriate access to information on chemical handling and accident management and on safer alternatives to the chemicals listed in Annex III to the Convention.

Finally, on December 13, 2006, the EU adopted a program called REACH (Registration, Evaluation and Authorization of Chemicals) to replace about 40 directives regulating chemicals in the EU. It covers the use of chemicals in nearly all products. The law puts the burden of proof on companies to show that industrial chemicals and substances used in commercial products are safe. Chemicals have to be registered with a new European Union database headquartered in Helsinki; the agency will have the power to ban chemicals presenting significant health threats.

Dangerous Goods by Air; International Convention for the Prevention of Pollution by Ships (MARPOL Nov. 2, 1973, Feb., 17, 1978); Regulation of the Carriage of Dangerous Substances on the Rhine (1970).

Companies are required to test chemicals and receive authorization for the most toxic substances, which number close to 1,500. Permission to use the most hazardous chemicals, those that are persistent, bioaccumulative, and toxic, will be conditioned on companies outlining plans to phase them out and develop safer substances.

2. Wastes

The problem of wastes changed and increased with the industrial age and the growth and concentration of human populations. In pre-industrial societies, there was little waste product, other than human sewage, because the bulk of substances and objects were reutilized in some way. Domestic animals consumed some waste, another part was used as agricultural fertilizer, and most metal was recycled. Today, the constant increase of industrial and agricultural waste has become a major concern. Moreover, the current economic system is based upon obsolescence and a “throw-away” culture designed to ensure the repeated replacement of products. All these factors accelerate waste accumulation. UNEP estimates that more than 400 million tons of hazardous waste is generated annually throughout the world, representing about 16 percent of total industrial waste. UNEP, *THE WORLD ENVIRONMENT 1972–1992* 264 (1997). Transfrontier movements have increased because of the economic advantages involved in shipping wastes for disposal to poorer countries where the costs are much lower. Disposal of hazardous waste may cost \$2,000 per ton in a developed country, compared to \$40 per ton in Africa. See Jennifer R. Kitt, *Waste Exports to the Developing World: A Global Response*, 7 *GEO. INT’L ENVTL. L. REV.* 485 (1995).

There is general agreement that the best means to control wastes is the reduction of the quantity of wastes produced. Those that are produced can be eliminated by different methods: discharge into surface dumps, burial in the earth, submersion into the oceans or lakes, and incineration. More ecological methods consider wastes, as much as possible, as primary derived material that should be reutilized or recycled. This concept is badly expressed in legal instruments, however, which generally are based upon the notion of waste as *res derelicta* (abandoned property).

The problem of toxic or dangerous wastes is becoming increasingly serious. Growing numbers of dump sites are found to contain toxic products. One of the legal problems raised by this topic results from the difficulty of defining “wastes.” The initial tendency in international regulation was to turn to national legislation for the definition of wastes. Thus, the OECD defined waste as “any material considered as waste or legally defined as waste in the country where it is situated or through or to which it is conveyed.” OECD Rec. C(83)80, Feb. 1, 1984.

In two cases, the European Court of Justice attempted to determine whether waste is defined as material destined for disposal or includes matter intended for recovery. See Case C-6/00, *Abfall Service AG (ASA) v.*

Bundeminister für Umwelt, Jugend und Familie (2002) and Case C-9/00, *Palin Granit OY and Vehmassalon kansanterveystyon huntayhtyman hallitus* (2002). Also at issue in the first case was the question of who determines whether waste is shipped for disposal or recovery, a significant issue because the rules governing waste vary according to whether it is for disposal or recovery. The Court permitted the authorities of the destination to scrutinize the initial classification of the shipping state, but also held that the decision in favor of “recovery” must be based on whether the operation serves a “useful purpose” in replacing other materials. Waste might be bound for recovery if “its principal objective is that the waste serve a useful purpose in replacing other materials which would have had to be used for that purpose.” In the second case, the issue of stone as waste arose. The Court held that the test of waste is whether a substance constitutes a production residue not sought for subsequent use and whether it is likely that the substance will be reused without any further processing prior to its reuse. Where, as here, the stone was likely to be stored for an indefinite period of time to await possible reuse, it was considered discarded and therefore waste.

The problem of toxic or dangerous wastes involves other legal problems. There is considerable overlap in regulation; e.g., specific rules regulate wastes, and rules aimed at protecting the seas and continental waters from pollution indirectly regulate them as well. There are also general rules concerning chemical products and norms for the protection of workers. Transport regulations, norms of transfrontier pollution, rules relating to territorial management, regimes of prior authorization, and environmental impact procedures also are relevant. Two particular aspects are of special concern and have led to direct international regulation of the handling of toxic or dangerous wastes: their management and transfrontier shipments of them. Three international institutions have addressed the problem of waste management: OECD, UNEP, and the EU. The first two have elaborated texts that, for the most part, are not obligatory. Those of the EU are in the form of mandatory directives, discussed in Section A.1.

The transport of toxic or dangerous substances from one country to another in order to eliminate, recycle or dispose of it is one of the most common forms of exporting pollution. Several reasons may motivate the producer of waste to seek to dispose of it in another country. First, the regulations of the producing country may make disposal there difficult. Radioactive wastes, for example, can be disposed of in only a few countries adequately equipped for retreatment and disposal. The wastes will thus be sent towards a country where regulation is less strict, or the monitoring of compliance is less effective. The most targeted countries are those that offer protection against claims and accept the wastes without always being concerned about the dangers they pose.

Another reason that could motivate a producer to export waste is lower disposal costs, even if the operation conforms to the law. The “importing”

country could offer inexpensive possibilities of storage, for example in abandoned mines or waste treatment plants less costly than those in the producing country. It is also evident that installations capable of treating certain types of waste do not exist in all countries. Finally, a multinational enterprise might have a foreign subsidiary specialized in the elimination of certain types of dangerous wastes. The enterprise will transport its wastes to the foreign subsidiary for treatment and disposal.

These factors led to an increasing movement of hazardous wastes across boundaries in the 1980s. The transport of hazardous wastes from developed countries to developing countries, which acquired the title "garbage imperialism," led at least 39 states to adopt and implement national legislation entirely prohibiting the importation into or transshipment through their territories of all foreign wastes.³ In addition, by the end of the 1980s a general opposition to transboundary movements of hazardous wastes led to international regulation, first at a global level, then regionally. Transfrontier disposal of waste also may be controlled by norms dealing with chemicals or transfrontier pollution.

At the global level, the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, Mar. 22, 1989) was adopted by 116 states. This instrument establishes a global framework for international regulation, although it has been criticized as not going far enough. Indeed, it does not ban all transboundary movements of hazardous waste. One of its objectives is to make the movements of hazardous waste so costly and difficult that industry will find it more profitable to cut down on waste production.

The Convention, like the earlier OECD text, defines wastes as substances or objects that are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law. The hazardous character of wastes is defined by combined approaches of Annexes I, II and III. Annex I lists categories of wastes to be controlled (e.g., chemical wastes from medical care in hospitals, and waste from different products, such as pharmaceuticals, or production of specified substances, such as biocides or organic solvents). Annex II contains two categories of wastes that require special consideration: wastes collected from households and residues arising from the incineration of household wastes. Annex III adds a list of hazardous characteristics of wastes, such as explosive, flammable, oxidizing, poisonous, infectious, corrosive, toxic and ecotoxic. This combined method is now increasingly used in international regulation, since the simple listing of polluting substances is inadequate.

³ States that have adopted such prohibitions include, e.g., Algeria, Barbados, Belize, Benin, Burundi, Comoros, Congo, Dominican Republic, Gabon, Gambia, Ghana, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Indonesia, Ivory Coast, Jamaica, Kenya, Liberia, Libya, Niger, Nigeria, Peru, Philippines, Saint Lucia, Senegal, Sierra Leone, Solomon Islands, Tanzania, Togo, Trinidad & Tobago, Turkey, Vanuatu, Venezuela, Yugoslavia, Zambia, and Zimbabwe.

Some of the important provisions in the Basel Convention are:

- The generation of hazardous wastes and other wastes and their transboundary movement should be reduced to a minimum consistent with the environmentally sound and efficient management of such wastes (Art. 4(2) (a) and (d));
- A signatory state cannot send hazardous waste to another signatory state that bans importation of it (Art. 4(1) (b)), to another signatory state, if the importing country does not have the facilities to dispose of the waste in an environmentally sound manner (Art. 4(2) (b) (e) and (g)), or to any non-party state (Art. 4(5));
- Every country has the sovereign right to refuse to accept a shipment of hazardous wastes (Art. 4(1) (a) and (12));
- Before an exporting country can start a shipment on its way, it must have the importing country's consent in writing (Art. 4(1) (c));
- When an importing country proves unable to dispose of legally imported waste in an environmentally sound way, then the exporting state has a duty either to take it back or to find some other way of disposing of it in an environmentally sound manner (Art. 8);
- The parties consider that "illegal traffic in hazardous wastes is criminal" (Art. 4(3));
- Shipments of hazardous waste must be packaged, labeled, and transported in conformity with generally accepted and recognized international rules and standards (Art. 4(7) (b)) and accompanied by a movement document from the point at which a transboundary movement commences to the point of disposal (Art. 4(7));
- Bilateral agreements may be made, but they must conform to the terms of the Basel Convention and be no less environmentally sound (Art. 11);
- Parties should cooperate in the training of technicians, exchange of information, and transfer of technology (Arts. 10 and 13).

At the Second Meeting of the Conference of the Parties (COP-2) in March 1994, parties agreed to an immediate ban on the export from OECD to non-OECD countries of hazardous wastes intended for final disposal. They also agreed to ban, by December 31, 1997, the export of wastes intended for recovery and recycling (Decision II/12). However, because Decision II/12 was not incorporated in the text of the Convention itself, the question arose as to whether or not it was legally binding. Therefore, at COP-3 in 1995, it was proposed that the ban be formally incorporated in the Basel Convention as an amendment (Decision III/1). The parties agreed to formally incorporate the ban as an amendment to the Convention, requiring ratification by three-fourths of the parties present at the adoption. It lacks two ratifications to enter into force as of December 1, 2006.

The Fourth Conference of the Parties, meeting in February 1998, adopted lists of hazardous (List A) and non-hazardous (List B) wastes. The

first list comprises wastes that may not be sent by Annex VII countries to other states. List B, contained in Annex IX, includes materials that are not subject to the shipment ban unless they contain constituents at a level that causes them to exhibit hazardous characteristics, such as flammability or toxicity. Even prior to the entry into force of the annexes, the European Union adopted a regulation giving effect to it. Regulation 2408/98, Nov. 7, 1998.

In 1998, parties to the Basel Convention turned their attention to elaborating a liability protocol, which was concluded December 10, 1999, and will enter into force with the 20th ratification, and to drafting guidelines on environmentally sound management of particular categories of hazardous wastes, e.g., lead acid batteries, plastic wastes, and decommissioned ships to be dismantled. These guidelines may include technical specifications for recycling and reclamation and specific strategies for implementation.

Several regional conventions also have been adopted in order to regulate transboundary movements of hazardous wastes. Even before the Basel Convention, the problem of the transboundary movements of hazardous wastes was addressed in the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (Noumea, Nov. 24, 1986), 26 ILM 38 (1987), a Convention of considerable scope. Arts. 10 and 11 of this Instrument speak of measures that the states in the region should take to prevent, reduce, and monitor, in the area covered by the Convention, pollution that could be caused by the immersion in the sea or by dumping of toxic or hazardous wastes.

Other regional treaties were adopted after the Basel Convention and are inspired by it. African states generally did not consider the original Basel Convention satisfactory and wanted to ban the importation of all hazardous wastes on their continent. They concluded, in the framework of the Organization of African Unity, a Convention on the Ban of the Import of Hazardous Wastes into Africa and on the Control of their Transboundary Movements within Africa (Bamako, Jan. 29, 1991), 30 ILM 773 (1991) and 31 ILM 163 (1992). The Convention, which advocates inter-African cooperation (Art. 10), is based on two principles: (1) states have the sovereign right to ban, for human health and environmental reasons, the transportation of hazardous wastes and substances into and across their territory and (2) hazardous wastes should, as far as is compatible with environmentally sound and efficient management, be disposed of in the country where they were generated.

Most of the provisions of the Bamako Convention correspond to those of the Basel Convention, but the regional Convention differs in some important respects from the global instrument. First, the definition of waste is broader and includes radioactive wastes that are subject to any international control system. Art. 2(3). Second, the parties must strive to apply the precautionary approach. Art. 4(3)(f). Most importantly, it prohibits the import of hazardous wastes for any reason into Africa from outside the

continent and from non-contracting states and declares such movement a criminal act. Art. 4(1). It prohibits dumping hazardous waste at sea, including incineration. Finally, the Convention requires the parties to impose unlimited joint and several liability on hazardous waste generators in Africa. Art. 4(3)(b).

The Regional Agreement on the Transboundary Movement of Hazardous Wastes (Panama, Dec. 11, 1992), adopted in 1992 by six Central-American countries, prohibits the transboundary transport, as well as the import and transit, of hazardous wastes. A 1995 Convention to Ban the Importation into Forum Island Countries of Hazardous Wastes and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific (Waigani, Sept. 16, 1995), further controlled the movements of hazardous waste. Within the Convention area, developing Pacific Island states shall ban the import of all hazardous wastes and radioactive wastes from outside the region. Finally, in 1996, the treaty system elaborated for the protection of the Mediterranean Sea was supplemented by a specific Protocol for the Prevention of the Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (Izmir, Oct. 1, 1996), UNEP(OCA)MED/IG.4/4. It is framed on the principles and approaches of the Basel Convention, but is integrated into the structures of the Mediterranean Treaty system.

Examples of bilateral treaties are the Agreement between Canada and the United States on Transfrontier Movements of Hazardous Wastes (Ottawa, Oct. 28, 1986) and Annex III to the Agreement of Cooperation for the Protection and Amelioration of the Environment in the Frontier Region between Mexico and the United States (Washington, Nov. 12, 1986, 26 ILM 16 (1987)).

In the spirit of Principle 21 of the Stockholm Declaration and respectful of the sovereignty of states, the preamble of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal reaffirms the right of states to refuse to accept on their territory hazardous wastes produced elsewhere. The fundamental principle in the field is that a state should only permit the export of hazardous wastes to a receiving state if that state consents to the importation by an explicit act in writing. Art. 4, Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel, Mar. 22, 1989). Similarly, Art. 9 of the Basel Convention provides that the exporting country will accept the return of any transport of hazardous waste that was not legally imported into the other country.

3. Nuclear Materials

On a general basis, the regulation of hazardous industrial activity is carried out through risk assessment and environmental impact assessment

procedures, as well as licensing and permitting. Industrial activities involving hazardous substances, particularly those like radioactive substances and biological agents that could be diverted into weapons or used in terrorist activities, are subject to particularly strict security measures.

The use of radioactive substances constitutes one of the most urgent but technically and politically difficult areas of environmental protection. There is, first, the problem of nuclear weapons, which nuclear states jealously guard. In addition to the acknowledged nuclear powers (United States, France, United Kingdom, Russia, China, India, Pakistan), approximately a dozen other states possess or control separated plutonium for military or commercial use. See Barry Kellman, *Protection of Nuclear Materials*, in COMMITMENT AND COMPLIANCE: THE ROLE OF NON-BINDING NORMS IN THE INTERNATIONAL LEGAL SYSTEM 486, 488 (D. Shelton ed., 2000). In addition to this critical issue, nuclear energy production has become a major industry. About 500 nuclear power plants are operating around the world. These power plants supply 16 percent of the world's electricity. Seventeen countries rely on nuclear energy for at least one-quarter of their total electricity demand. To these issues must be added the growing problem of illicit trafficking in nuclear materials.

The International Atomic Energy Agency (IAEA), headquartered in Vienna, has been given broadest responsibility in the field, although both the European Agency for Nuclear Energy and Euratom, created in 1957, work on the topic as well. The IAEA negotiates international treaties providing the structure of the nuclear safety system, supplemented by recommendations that detail the protective measures.

For nuclear weapons, the most general international text is the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Underwater (Moscow, Aug. 5, 1963). Nearly all states of the world are parties to it. Five years later, the Nuclear Non-Proliferation Treaty (NPT, July 1, 1968, 21 UST 483, TIAS No. 6839, 719 UNTS 161, 7 ILM 809) obliged each non-nuclear weapon state to ensure that nuclear materials, equipment, facilities, and information are not used to advance military purposes. The Treaty requires these states to accept international safeguards under IAEA supervision, including reporting requirements, installation of monitoring equipment, and on-site inspections. Art. III. More than 180 states have entered into bilateral safeguards agreements with the IAEA pursuant to the NPT. These agreements are themselves supplemented by subsidiary agreements containing more detailed operating procedures. The package of commitments allows the IAEA to verify, through state reporting and on-site inspections, the security of nuclear materials and the features of nuclear facilities.

The Antarctic Treaty (Washington, Dec. 1, 1959, Art. 5) goes further in forbidding not only nuclear explosions, but also all weapons and radioactive wastes in the Antarctic region. Placing objects carrying nuclear arms on the moon or in orbit around the moon is equally forbidden by the

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (Dec. 5, 1979). Finally, in 1996 the Nuclear Test Ban Treaty of 1963 was expanded to ban all categories of nuclear tests by a Comprehensive Nuclear Ban Treaty and a Protocol that complements it.

In addition to the IAEA Statute and the NPT, several other treaties address the protection of nuclear materials. The most important is the 1980 Convention on the Physical Protection of Nuclear Material,

Other agreements also add protective norms. Separate instruments govern matters of transport and radiological emergencies. Regulations on the transport of nuclear material are contained within general conventional norms concerning transport by road, rail, sea, and air. See e.g., the IMO Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium, and High-Level Radioactive Waste in Flasks on Board Ships, IMO Assembly Res. A. 748(18) (Nov. 4, 1993). Following recommendations by IAEA, the member states subsequently negotiated the Convention on the Physical Protection of Nuclear Material (Mar. 3, 1980). The treaty establishes a framework for international cooperation to protect civilian nuclear material while in storage and transport. Its aims are to avert the potential dangers of unlawful taking and use of nuclear materials; adopt appropriate and effective measures to ensure the prevention, detention, and punishment of such offenses; establish effective measures for the physical protection of nuclear material; and facilitate its safe transfer. The provisions focus on the obligations of states during transport of nuclear material to ensure a minimum level of physical protection.

IAEA further developed the law by sponsoring the adoption in Vienna, on June 17, 1994, of a Convention on Nuclear Safety. It entered into force after only two years on October 24, 1996, probably due to awareness of the danger posed by some unsafe conditions in nuclear installations in former parts of the Soviet Union. Its objective is to achieve and maintain a high level of nuclear safety worldwide through enhancement of national measures and international cooperation including safety-related technical cooperation. Art. 1(i). The Convention reaffirms that responsibility for nuclear safety rests with the state having jurisdiction over a nuclear installation. It entails a commitment to apply fundamental safety principles for such installations.

The general obligation of the contracting parties is to establish and maintain effective defenses in nuclear installations against potential radiological hazards (Art. 1(ii)), in particular by reviewing as soon as possible the safety of existing nuclear installations (Art. 6). The Convention stresses the importance of the legislative and regulatory framework, which each party shall establish and maintain to govern the safety of nuclear installations, including a system of licensing and inspection and assessment to ascertain compliance with applicable regulations and the term of licenses. Art. 7. In addition to the general safety norms, the Convention includes specific prescriptions concerning the siting (Art. 17), the design and con-

struction (Art. 18), and the operation (Art. 19) of nuclear installations.

IAEA first elaborated directives concerning the procedures to be followed in case of nuclear accident. These directives were published in 1969; they were further developed in 1981 and in 1985, but were not implemented as they should have been, as the Chernobyl accident demonstrated.

As described earlier, on April 26, 1986, at 1:23 in the morning, an explosion occurred in reactor Number 4 of the Chernobyl nuclear power plant. By May 4, unusually high levels of radioactivity were found in the milk on farms in Austria, Hungary, Italy, Sweden, and Yugoslavia, and relatively high values of Cesium-137 in milk on farms in Switzerland, the United Kingdom, Austria and Germany. The radioactive half-life of Iodine-131 is only about eight days, while the half-life of Cesium-137 is approximately 30 years, meaning the latter could persist in the environment at significant levels for well over a century.

The IAEA took action after being requested to assist in fact-finding concerning the circumstances of the accident and to prepare a text transforming certain principles of international environmental law into obligatory rules applicable in cases of nuclear accidents of international scope. A meeting organized by it drafted two conventions. The Convention on Early Notification of a Nuclear Accident, signed Sept. 26, 1986, entered into force Oct. 27, 1986; the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency was signed the same day and was also rapidly ratified by the signatories.

The first of the two conventions, relating to rapid notification of nuclear accidents, expresses and gives concrete application to the duty to inform other states that may be affected by an accident causing environmental harm. While making this obligation explicit, the Convention remains a cautious text. It does not speak to the problems of liability and reparation for damage, but, instead, it speaks of the necessity for states to furnish pertinent information on nuclear accidents as soon as possible. The states affected can demand further information or consultations in order to limit, as much as possible, the radioactive consequences within the limits of their jurisdictions.

The obligation to notify applies to all accidents in any nuclear reactor, in any nuclear fuel cycle facility, or radioactive waste management facility, during the transport and storage of nuclear fuels, as well as during any operation involving the manufacture, use, storage, disposal, or transport of radioisotopes, including the use of nuclear-powered spacecraft. Nuclear arms are not mentioned.

The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Vienna, Sept. 26, 1986), similarly corresponds to rules already existing in international law. However, even if customary international law imposes on states a general obligation to cooperate, it does not indicate the means and methods of the assistance, which must be explicitly detailed by conventional law. The Vienna Convention on

Assistance reinforces the duty to aid states that are victims of catastrophes, and expands it, in particular, to radiological catastrophes, developing the implications of this expanded norm. The Convention still remains, however, a framework treaty that explicitly calls for the conclusion of bilateral or multilateral arrangements and action of the IAEA to promote, facilitate, and encourage cooperation between the states parties. Any state that is exposed can claim assistance, whether or not the origin of the accident or emergency is found within its territory, under its jurisdiction, or under its control.

As always, when there is a question of mutual assistance in response to an emergency, two types of measures are foreseen by the Convention: preventive measures and those to be undertaken when the situation is actually presented. In the first category, the Convention provides for identifying and notifying the IAEA of experts, equipment, and materials that could be made available to provide assistance, as well as the terms, notably financial, under which such assistance could be furnished, the authorities competent to intervene and points of contact, the emergency plans, and implementation of programs of assistance and monitoring of radioactivity. When a crisis arises, the state party to the Convention who requires assistance should indicate the scope and type of assistance required and should furnish all information that could be necessary. Each state may request assistance relating to medical treatment or the temporary relocation of persons involved in a nuclear accident or radiological emergency into the territory of another state.

The state requiring assistance has direction, control, coordination, and supervision of all assistance on its territory. Within possible limits, it should furnish the equipment and local services necessary for the proper and effective administration of assistance. On the other hand, measures that occur on the territory of the state that furnishes the assistance are under the latter's control.

The Convention also addresses the issue of reimbursement of costs. If the state that furnishes the assistance does not offer its services freely, the state having requested the assistance should reimburse the assisting state, as well as any persons or organizations acting on its behalf, for all costs incurred for the services rendered and for any other costs of assistance. Art. 8 provides that privileges and immunities are accorded to personnel who furnish assistance to a foreign state—immunity from arrest, detention, and legal process in the jurisdiction—and also exemption from taxation, duties, or other charges.

It is interesting to note that no government appears to have pushed to conclude rules on strict liability for nuclear accidents. The difficulty of evaluating the cost of the consequences of the Chernobyl accident, especially the precautionary measures taken by the affected countries, may have been a determinant factor in avoiding the issue of state responsibility. It also seems, however, to be consistent with the general reticence displayed

towards rules imposing international responsibility or liability on states for damages caused by its own activities. The emphatic preference remains measures of prevention, rather than cure.

One of the principal problems posed by nuclear activities is the disposal of radioactive wastes. It is therefore important to regulate the discharge of nuclear matter into the environment. In many cases, the disposal of radioactive wastes is accomplished within a state's borders, but the level of international shipments appears to be rising. The principal questions in international law level thus concern transport and the immersion of radioactive waste in areas beyond national jurisdiction.

Several international conventions contain provisions prohibiting the dumping of radioactive wastes. The most important of them is the London Convention on the Prevention of Pollution by Dumping of Wastes and Other Matter (London Dumping Convention, Dec. 29, 1972). Art. IV of this Convention, combined with Annex I, forbids the immersion of "high-level radioactive wastes or other high level radioactive matter, . . . as unsuitable for dumping at sea."

As to transport, the IAEA adopted a Code of Practice on the International Movement of Radioactive Waste in 1991. The regulations hold the shipper responsible for design safety and for the correct assembly of the package, as well as for labeling and marking. The carrier is responsible for providing the necessary control measures during transport and storage in transit. Access to packages should be restricted. The question of transport has raised problems under UNCLOS because of the dangers involved in shipping radioactive waste or materials. UNCLOS guarantees a right of innocent passage through the territorial seas of states (Art. 17) and provides that ships carrying nuclear or other inherently dangerous or noxious substances shall "when exercising the right of innocent passage through the territorial sea" observe special precautionary measures. These provisions appear to ensure the right of passage for ships carrying nuclear materials, including waste, but some states have objected to shipments of plutonium passing so close to their coastlines.

4. Biotechnology

Throughout history, farmers have used selective breeding to alter their livestock and crops for qualities sought by the farmers or consumers. They have also applied biological fermentation to produce new products and increase the period of conserving food. These techniques rely on genetic variation, including mutations, already present in species and populations of flora and fauna. All major crops and farm animals are the product of some degree of human intervention.

Genetic modification or biotechnology differs from the directed but natural processes of selective breeding. Genetic engineering isolates single genes from an organism and transfers one or more to another organ-

ism, across populations and across species or phyla. Animal genes may be inserted into plants and vice versa. Once inserted, the genes may be transmitted to subsequent generations.

The 1992 UN Convention on Biological Diversity defines biotechnology to include any technological application that utilizes biological systems, living organisms, or derivations of them, to create or modify products or processes to a specific use. One of the most controversial subjects concerning this science is the scope of potential risks associated with the handling and introduction into the environment of living modified organisms (LMOs) or, as they were first referred to, genetically modified organisms. The need to promote biosafety has centered on two related issues: first, the handling of LMOs at the laboratory level, in order to protect workers and prevent the accidental liberation of such organisms into the surrounding ecosystem ("contained use"); second, the need for regulatory systems to govern the deliberate release of LMOs into the environment, either for testing or commercial purposes.

Genetic engineering has reached the point where living organisms can be adapted and created in the laboratory. Many of these LMOs are not intended to stay in the laboratory, however. Genetically altered corn and soybean seeds are already in use, with perhaps as many as 20 million acres planted with them in the United States alone. Research is being carried out to introduce herbicide resistance into virtually all major crops as a means of making it easier to control weeds. In addition, because of the noxious effects of long-term pesticide use, genetic engineering of microorganisms has developed as an alternative strategy to improve pest control. Some 100 fungus species and many bacteria species are known to have insecticidal effects.

The use of biotechnology to raise crop yields has received the most publicity and been the most controversial, including efforts to broaden the germplasm basis from which new genetic combinations can be created and improving and speeding up the propagation of plants. The most widely used and commercially successful application of plant biotechnology is the rapid and large-scale multiplication of plants through clones produced in tissue culture. The technique is currently used to mass produce ornamental fruit, vegetable, and medicinal plant and tree species.

Many scientists see biotechnology as permitting them to pursue plant breeding efforts, with favorable impact on food supplies, international trade in agricultural products, the environment, and existing plant resources. The commercial nature of many of these potential benefits is a source of disagreement, however, particularly between developed and developing countries who disagree over access to, control of, and benefits from primary and modified genetic resources.

Aware of possible benefits, a substantial number of scientists nonetheless urge caution in releasing genetically engineered organisms because of the possibility that such organisms might have an unfavorable impact

upon the environment, and because considerable scientific uncertainty exists about the scope and degree of the environmental risk. There is fear that the LMOs, as living organisms, could evolve into destructive pathogens. Moreover, genetically altered genes may naturally transfer to wild-grown relatives, with unforeseeable consequences. Thus far, the major negative impact that has been identified and studied is the harm to monarch butterflies caused by the protein used in genetically altered corn to repel certain pests. See "Monarch Larvae Killed by Bt-Dusted Leaves, Iowa State University Researchers Report," *BNA Int'l Envtl. Rep.*, Aug. 30, 2000, 682.

Particular concerns arise over the release of LMOs in or close to a center of genetic diversity of that crop. Mass production of identical plant materials introduces greater danger of genetic destruction, because all specimens are equally vulnerable to a single disease or pest. No resistant varieties remain as alternative sources. The widespread use of cloned crops or artificial seeds to replace sexually reproducing crops will thus likely increase crop vulnerability. Finally, the release of genetically modified micro-organisms (bacteria and fungi) could pose particular problems. Very little is known about microbial communities; few have been named or studied. However, current research indicates that natural genetic transfer between different micro-organisms is relatively frequent, making it conceivable that engineered species could transfer throughout the microbial world in unpredictable ways.

Uncertainty surrounding the environmental impacts of LMOs is recognized in the Convention on Biological Diversity (CBD), which does not define the term "living modified organism" but calls on the contracting parties to consider the need for a protocol setting out procedures for the safe transfer, handling, and use of any living modified organism resulting from biotechnology that may have adverse effect on the environment. Art. 19(3). The Convention itself obligates parties to "provide any available information about the use and safety regulations required by th[e] contracting party in handling such organisms, as well as any available information on the potential adverse impact of the specified organisms to concerned" to any party into which those organisms are introduced.

In respect to *in situ* conservation, the CBD requires the parties to establish or maintain means to regulate, manage, or control the risks associated with the use and release of living modified organisms resulting from biotechnology, which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking into account the risks to human health. The Convention also calls for recognizing the rights of countries of origin of genetic resources or countries providing genetic resources, particularly developing countries, to benefit from the biotechnological development and the commercial utilization of products derived from such resources. Art. 15.4(j).

After extensive negotiations, the CBD states parties adopted a Protocol on Biosafety (Jan. 29, 2000). The United States, not a party to the CBD, participated in the negotiations as an observer. The objective of the Protocol is to contribute to ensuring an adequate level of protection in the safe transfer, handling and use of living biotechnology modified organisms that may have adverse effects on the conservation and sustainable use of biological diversity, taking into account risks to human health and specifically focusing on transboundary movements. Preamble, Arts. 1 and 4. The Protocol does not apply to the transboundary movement of living modified organisms that are pharmaceuticals for human use and that are addressed by relevant international agreements or organizations, nor to the transit and contained use of living modified organisms. These exceptions do not preclude a party from subjecting such actions to prior risk assessment. Arts. 5 and 6.

The Protocol institutes an "advance informed agreement" procedure that mirrors prior informed consent procedures contained in other international treaties. Thus, the state of export must notify or require the exporter to notify, in writing, the competent national authority of the state of import prior to the intentional transboundary movement of a living modified organism. The party of import is to acknowledge the notification in writing, but failure to do so does not imply consent to the shipment. Art. 9. The importing state has 270 days from the date of notification to make a decision on permitting or denying the importation and must transmit the decision to the notifying party and to a Biosafety Clearing House established by the Protocol. Arts. 10 and 20. A special procedure is foreseen for domestic use of LMOs, including marketing a living modified organism that may be subject to transboundary movement for direct use as food or feed or for processing. Art. 11. Annex II lists the information required for such use, which may include a risk assessment report.

Apart from the intentional movements of LMOs, each party shall take appropriate measures to notify affected or potentially affected states, the Biodiversity Clearing House, and, when appropriate, relevant international organizations, when it knows of a release that leads or may lead to an unintentional transboundary movement of a living modified organism that is likely to have significant adverse effects on the conservation and sustainable use of biological diversity or creates risks to human health. Art. 17. States parties also must prevent and, if appropriate, penalize illegal transboundary movements of living modified organisms. Art. 25.

As this overview has attempted to show, all environmental milieu are regulated at the international level by global and regional treaties. The emphasis in treaty bodies and international organizations since the 2002 Johannesburg Summit has increasingly turned from standard-setting to implementation and compliance review. Training and capacity-building are high priorities in this task, but the growing number of interstate and

individual complaints about transfrontier pollution indicates that critical awareness is present, coupled with a growing insistence that states comply with their international environmental obligations. The next chapter turns to another means of furthering environmental protection, which is to ensure that it is taken into consideration in other matters of international regulation. In international organizations, this is referred to as mainstreaming environmental law.

Chapter VIII

Environmental Protection in Other Subject Areas of International Law

A. REGIONAL ECONOMIC INTEGRATION

1. The European Union

The European Union, originally consisting of six Western European countries and expanded to 27 states, began as a set of three regional communities, which merged into a single entity (the European Community) that was transformed into the Union.

The founding documents, the 1951 Paris Treaty creating the European Coal and Steel Community, the 1957 Treaty of Rome establishing the European Economic Community (EEC), and the 1957 Euratom Treaty, were focused exclusively on building a customs union and other forms of economic integration. There was no mention of environmental matters.

The Stockholm Conference raised the profile of environmental issues in the Communities, as it did elsewhere. Shortly after the Conference, in 1974, the EEC Commission adopted the first Program of Action on the Environment. By this point, economic distortions caused by the different environmental laws in the member states had become evident, as had recognition that the goal of economic integration, to improve the well-being of Europeans, could not take place without environmental protection. Since 1974, the Commission has continued to elaborate periodic Programs of Action of the European Communities on the Environment, although a treaty basis for action was lacking until the Communities merged as a consequence of the Single European Act.

a. The Treaty Framework

At present, the legal foundation for environmental action by the European Union is the consolidated treaty approved in Amsterdam on October 2,

1997 (TEU). See EU Consolidated Versions of the Treaty of European Union and the Treaty Establishing the European Community, 2002 O.J. (C 32). TEU Art. 3 sets forth the objectives of the EU and includes the field of environmental protection. Art. 174(2) adds that the Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. Further details are contained in Arts. 174 to 176. Art. 174(1) designates the four aims of the Community environmental policy: (1) preserving, protecting, and improving the quality of the environment, (2) protecting human health, (3) prudent and rational utilization of natural resources, and (4) prompting measures at the international level to deal with regional or worldwide environmental problems.

Art. 174(2) proclaims that the Community's environmental policy shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source, and that the polluter should pay. According to Art. 174(3), in preparing its policy on the environment, the Community shall take account of: available scientific and technical data; environmental conditions in the various regions of the Community; the potential benefits and costs of action or lack of action; the economic and social development of the Community as a whole and the balanced development of its regions. Art. 174(3).

While the TEU confers specific powers on the Community in the field of environmental protection, it also establishes limits on those powers. In particular:

1. Such powers are to be exercised only if the Community's environmental objectives can be attained better at the Community level than at the level of the individual member states. This flows from the principle of subsidiarity, one of the basic principles of the Community.
2. According to Art. 174(2)(2), harmonization measures for environmental protection shall include, where appropriate, a safeguard clause allowing member states to take provisional measures, for non-economic environmental reasons, subject to a Community inspection procedure.
3. The protective measures adopted pursuant to the environmental principles proclaimed by the Treaty shall not prevent any member state from maintaining or introducing more stringent protective measures. Such measures must be compatible with the Treaty, however, and be notified to the Commission. Art. 176. Concerns about the impact of environmental measures on free trade are evident and arise not only inside the European Community but also in the larger context of globalization.
4. Finally, while Art. 174(4) recognizes the capacity and the authority of the Community to conclude arrangements with non-member states

or other international institutions in the field of environmental protection, it also affirms that such authority does not deprive the member states of the right to negotiate in international bodies and to conclude international agreements.

b. Institutions

The main institutions of the European Union are the Council of the European Union, the European Commission, the European Parliament, and the European Court of Justice. The Council is the only institution that directly represents the governments of the member states. The Council consists of a “representative of each Member State at ministerial level, authorized to commit the government of that Member State.” TEU, Art. 146. The ministers who meet are specialists, chosen by their government according to the issue that is discussed. The environment ministers meet regularly two or three times a year as the Council of Ministers. The most important acts that the Council adopts are regulations and directives. See Section A.1. In both cases, the Council adopts such texts after submission of a proposal by the Commission and required consultations. The Council acts either upon unanimous or weighed majority vote.

The Commission has one person from each member state, although Commissioners act in the Community’s interest and not on behalf of their individual states. The Commission is appointed, by unanimous agreement of the member states, for a five-year term and can only be removed by vote of censure from the European Parliament. The two principal functions of the Commission are to propose Community policy to implement the treaties and to provide for the administration of the Community. In regard to the first activity, the Commission prepares, discusses, and adopts preliminary drafts of proposed standards for submission to the Council.

The second main function is foreseen by TEU Art. 211, which provides that the Commission must “ensure that the provisions of the Treaty and the measures taken by the institutions pursuant thereto are applied.” The latter authority is exclusive and may not be delegated to any other organ or institution. In supervising implementation of the Treaty and of other Community obligations, the Commission acts where it finds a Treaty infringement, first by sending a formal note, then by delivering a “reasoned opinion.” Subsequently, if further action is needed, the Commission may bring a judicial proceeding against the involved member state or entity. It also can take other measures, when, e.g., a member state does not incorporate or apply Community rules, by warning it that other members states could take sanctions against it.

The European Parliament has 626 members directly elected by the people of the member states and serving for a period of five years. Members of the European Parliament do not sit by nationality but according to political affiliation. The Parliament participates in the formulation of EC Law

and the Community budget, as well as in monitoring the activities of the European Commission and Council. The Parliament has set up a special committee on environment, public health, and consumer protection. Its main influence on legislation lies in its right to be consulted, its right to move amendments, and its power to delay legislation by withholding its opinion until the Commission responds to its proposed amendments. When the Council has transmitted to Parliament a Common or Interim Position it adopted, and Parliament initially rejects or amends it, the Council must convene a "Conciliation Committee" to negotiate a compromise. Within specified time limits, the Council representatives and the parliamentary representatives must attempt to negotiate a common position. Once achieved, the Council and Parliament vote on the Committee proposal, by qualified and absolute majorities, respectively. Unless approved by both, the proposal lapses. If the Committee fails to achieve a common proposal, the Council may go forward with its draft unless the Parliament rejects it by absolute majority.

Once a regulation or directive is adopted, the European Court of Justice ensures correct interpretation and application of its provisions. The Court is composed of 15 judges and eight advocates-general, the former organized in chambers of three, five, or seven judges. There is one judge sitting for each member state. The advocates-general, who act as advisors to the court, are also nominated by member states. The Court has jurisdiction to settle disputes within the Community and to award damages. It may review the validity of acts of the Council or the Commission and give judgments on actions by member states, the Council or the Commission when it is alleged that there has been legal incompetence, errors of substantial form, infringement of the treaties, or abuse of power. Any individual or company may appeal a decision addressed to it, or an act that, although in the form of a regulation or decision addressed to another person, is of direct and individual concern.

In 1988, a Court of First Instance was set up, consisting of 15 judges nominated by member states. Its jurisdiction extends to direct actions brought by natural or legal persons, whether for annulment or damages. Appeals may be taken to the European Court of Justice only on points of law.

Two bodies of consultative character can play a role in the legislative process of the EC. The Economic and Social Committee ensures the involvement of all economic and social groups in the development of the EC: it represents employers, workers, and various interest groups from agriculture, transportation, the professions, and consumers. Its members are appointed by the Council. A Committee of the Regions represents regional and local communities; its members are equally appointed by the Council. Finally, the Council created a European Environmental Agency on May 7, 1990. Its main objective is to provide technical and scientific support to the Community and member states regarding environmental protection.

c. Environmental Laws in the EU

During its existence of almost half a century, the EC has developed comprehensive legislation in environmental matters. It also a contracting party to the major international treaties on pollution reduction and biological diversity. EC legislative acts consist of regulations and directives. A regulation has general application and is binding in its entirety. It is directly applicable in all member states. A directive is distinguished from a regulation in that it imposes obligations on member states to achieve specific results, leaving the choice of means up to the states. Directives normally require implementing measures by the member states. In addition to regulations and directives, the EC may address decisions to a specific member state or a legal or natural person. Decisions are normally of an administrative nature, implementing other Community laws.

Over time, the EC adopted directives of general scope relating to the assessment of the effects of certain public and private projects on the environment (Directives 85/337, 1985 O.J. (L 175), and 97/11, 1997 O.J. (L 5)), integrated pollution prevention and control, freedom of access to information on the environment (Directive 90/313, 1990 O.J. (L 158)), and ecolabeling (Regulation 880/92, 1997 O.J. (L 58)). Following the general trend in domestic, as well as in international environmental legislation, its policy shifted from indirect approaches to distinct measures aimed at the protection of water, air, or wildlife. During the 1990s the EC demonstrated a general trend towards integrated protection and most human activities that can have an impact on the environment enter the scope of EC environmental legislation. At the same time, economic aspects of the proposed measures, as well as the generally proclaimed need for sustainable development, are increasingly taken into account.

i. Air Pollution

The European Union, as it has evolved from the Common Market and the European Community, has adopted three types of legislation concerning air pollution. Several directives have a general scope, others concern specific forms and sources of pollution, and the third establishes ambient air quality objectives.

Following the “discovery” at the beginning of the 1980s of damage to the forests of central Europe, the EC adopted a general directive relating to air pollution produced by industrial installations. Directive 84/360, June 28, 1984, 1984 O.J. (L 188). This directive introduced the obligation to obtain specific authorization for new industrial installations that emit pollutants into the air, including energy production (mines, oil refineries), and working of metals and minerals, chemical industries, waste treatment, and certain paper mills. Authorities may not deliver licenses unless the enterprise has adopted appropriate measures to prevent air pollution and

respects the limit values for emissions and air quality. The license should require utilization of the best available technology not involving excessive costs and, in addition, take into account existing value limits. Member states also are required to develop strategies and programs to progressively adapt existing industrial facilities to the requirements of the best available technology. Specially protected zones can be established. Demands for authorization and decisions of competent authorities should be placed before the affected public, and environmental impact statements can be required. When pollution is capable of affecting other EC states, they should be informed and can request consultations.

Following the lead of this directive, the Council adopted, in 1988, a directive on installations of combustion of 50 megawatt or more. Directive 88/609, June 12, 1988, 1988 O.J. (L 336). Each new installation must respect the emission norms fixed by the directive for sulfur dioxide, particulates, and nitrogen oxides. For existing plants, member states had to create and implement programs aimed at progressively reducing their annual emissions of these elements. The reductions in relation to 1980 up to the year 2003 were indicated in absolute quantities and in percentages. Parallel directives provide for emission limit values for municipal waste-incineration plants (Directives 89/369 and 89/429, 1989 O.J. (L 163), 32 and 1989 O.J. (L 203), 50, later amended) and for the incineration of hazardous wastes (Directive 94/67, 1994 O.J. (L 365), 34). General EC directives, such as directive 85/337/EEC of June 27, 1985, 1985 O.J. (L 175) concerning assessment of the effects of certain public and private projects, and the *Seveso* directive (82/501/EEC, June 24, 1982, 1982 O.J. (L 230), modified by Directive 87/216, Mar. 19, 1987, 1987 O.J. (L 85)) relating to the risks of major accidents of certain industrial activities, equally apply to activities that risk causing major air pollution.

In addition to efforts to reduce air pollution by directives of general scope, EC measures aim to reduce emissions from specific sources. Directive 70/220, 1970 O.J. (L 76), 1, modified several times, concerns polluting emissions from automobiles; a 1975 directive fixed the limit of sulfur in diesel fuel (Directive 75/116, 1975 O.J. (L 307), 22); another directive limited the amount of lead in gasoline (Directive 78/611, Feb. 20, 1978, 1978 O.J. (L 197), 19). These laws began by establishing uniform rules, but the directive relating to the sulfur content of diesel fuel introduced flexibility by providing that states should establish zones in which the permissible amount of sulfur differs according to local conditions.

Other environmental directives establish quality objectives for the entire Community. Such objectives are fixed for sulfur dioxide and particulates (Directive 80/779, 1980 O.J. (L 229), 30), lead (Directive 82/884, 1982 O.J. (L 378), 15), and nitrogen dioxide (Directive 85/203, 1985 O.J. (L 87), 1). Community legislation has evolved away from quality objectives, however, because adequate environmental protection is difficult to attain by this method. Recent directives show a preference for an "at source"

approach that limits polluting emissions. This technique also has its limits, given that the notion of the “best available technology not involving excessive costs” is viewed in a different manner from one member state to another, so that a permanent coordination at the Community level is required to assure harmonized implementation.

More recently, Directive 2002/3/EC of the European Parliament and of the Council, Feb. 12, 2002, Directive 85/203, 1985 O.J. (L 87), 1, aims at controlling ambient concentrations of ozone in order to avoid, prevent, or reduce harmful effects on human health and the environment. It sets target values for 2010 in respect of such concentrations, invites states to draw up a list of zones and regions in which ozone levels meet the long-term objectives. Where ozone concentrations exceeding target values or long-term objectives are due to precursor emissions in other states, joint plans and programs shall be drawn up in order to attain the target values or long-term objectives. If appropriate, member states shall prepare and implement short-term joint Action Plans covering transboundary neighbouring zones.

ii. Freshwaters

The European Community also has made efforts to address the problem of water pollution in all its aspects. As a quasi-federal entity, its approach goes beyond the consideration of transboundary waters to include the internal water resources of its member states. The EC’s water law was developed initially in the mid-1970s to address specific substances, sources, processes, and uses of water, as well as its function in habitat protection.

For 20 years the main EC instrument was Directive 76/464/ECE, May 4, 1976, 1976 O.J. (L 129) concerning pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. Separate directives set quality standards for different uses of the aquatic environment (drinking water, bathing, fish farming, etc). Directive 75/440, June 16, 1975, concerning the quality required of surface waters intended for abstraction of drinking water, 1975 O.J. (L 194); Directive 79/869, Oct. 9, 1979, relating to the methods of measurement and the frequency of sampling and analysis of surface waters to be used for drinking, 1979 O.J. (L 271); Directive 80/778, July 15, 1980, relating to the quality of water intended for human consumption, 1980 O.J. (L 299). Directive 76/160, Dec. 8, 1986, concerning the quality of bathing waters, 1976 O.J. (L 31); Directive 78/659, July 18, 1978, concerning the quality of fresh water needing protection or improvement in order to support fish life, 1978 O.J. (L 222); Directive 79/923, Oct. 30, 1979, relating to the quality required of shellfish waters, 1979 O.J. (L 281). The directive set quantity parameters, conditions of sampling, and methods of analysis and inspection. These disparate standards were updated and combined in a new general framework directive, Directive 2000/60/EC, 2000 O.J. (L 327).

A decision of November 20, 2001, amended and complemented the framework directive by establishing a new list of priority substances in the field of water policy. Decision No. 2455/2001/EC, 2001 O.J. (L 331) established a comprehensive policy for Community action on water, which aims to introduce a strategic framework, providing more holistic and integrated approaches to water management and conservation. The underlying aims are: (1) to use hydrological catchments rather than political or administrative boundaries as the basis for action; (2) to set environmental objectives to ensure that all waters achieve good status and do not deteriorate; (3) to introduce a combined approach to pollution control and encourage sustainable water use; (4) to contribute to mitigating the effects of floods and droughts; and (5) to ensure active stakeholder and community involvement. Europe is divided into a series of river basin districts, some of which will traverse international boundaries. River basin management plans establish a program of measures to meet specific environmental objectives for each river basin.

The basic principle of the Directive is that water is not a commercial product like any other but, rather, a heritage that must be protected, defended, and treated as such. The supply of water is a service of general interest. Further, protection and sustainable management of water must be integrated into other Community policy areas, such as energy, transport, agriculture, fisheries, regional policy, and tourism. The Directive itself aims to maintain and improve the aquatic environment in the Community by contributing to the progressive reduction of emissions of substances presenting a significant risk to or via the aquatic environment, including risks to waters used for the abstraction of drinking water. Using a combined approach for point and diffuse pollution sources, the Community is to adopt common environmental quality standards and emission limit values for certain groups or families of pollutants in order to prevent further deterioration of aquatic ecosystems, protect and enhance their status, and promote sustainable water use based on long-term protection of available water resources.

The Directive innovates by covering inland surface waters and groundwater, as well as by adding the categories of “transitional waters” and “coastal waters.” Transitional waters are bodies of surface water in the vicinity of a river mouth, which are partly saline but which are substantially influenced by freshwater flows. Coastal water means surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward from the baseline, which means a portion of the territorial sea.

The Directive sets distinct environmental objectives for basin management plans for surface waters, for groundwater, and for protected areas. Art. 4. Specific provisions apply to waters used for the abstraction of drinking water. Art. 7. Art. 9 affirms the principle that the costs for water services, including environmental and resource costs, should be recovered

from the user. The Directive encourages the active involvement of all interested parties in its implementation, by ensuring that each river basin district makes available or publishes information for public comment and consultation on significant water management issues. Art. 14.

The Directive foresees classifying water quality as high, good, fair, poor, or bad based on a range of ecological, chemical, and hydrological criteria. By 2015, all surface waters should be classified as “good.”

The EC also has adopted several directives aimed at marine waters. In particular, EC Directive, 76/464/EEC, May 4, 1976, 1976 O.J. (L 129), relating to the protection of the aquatic environment, explicitly applies to the territorial seas of member states. This text contains a system of prohibition and authorization based on lists of harmful discharges, but it also envisages quality standards. Programs to reduce pollution and improve water quality had to be implemented within time limits fixed by the European Commission. The EC directives to preserve inland water quality, although they primarily aim at protecting fresh waters from pollution, can lessen marine pollution from land-based sources.

iii. Hazardous Substances and Activities

The marketing of chemical products has been regulated by the EC since the end of the 1960s as a response to the necessities of the common market. It establishes methods for determining the physico-chemical properties, as well as the toxicity and ecotoxicity of substances and preparations, and the characteristics that should be taken into account in evaluating the danger, real or potential, which the substances can pose to the environment. It also establishes a notification system. In December 2006, the EU adopted a new program, known as REACH, to regulate the testing, registration and authorization process for hazardous chemicals. See Chapter VII, Section E.1 for a discussion of the law.

The risk of major accident hazards involving certain industrial activities was the subject of well-known EC Directive, 82/501/EEC, June 24, 1982, 1982 O.J. (L 230). The text, known as the “Seveso directive,” is named for the Italian town where the most serious industrial accident in European history occurred on July 10, 1976. The Directive requires EC member states to take measures necessary to ensure that all manufacturers engaged in certain listed activities prove to the competent authority that they have identified the existing major accident hazards, adopted the appropriate safety measures, and provided persons working on the site with sufficient information, training, and equipment in order to ensure their safety. The manufacturers should notify the appropriate authorities of information relating to dangerous substances contained in a list annexed to the directive, which are employed or produced in one form or another at some stage during the manufacturing process. Emergency plans and assistance relating to events outside the concerned installation should be established,

and persons potentially victims of a major accident must be informed of the emergency measures to be taken in case of accident. Should such an accident occur, the manufacturer must inform the appropriate authorities, providing them with all the necessary information.

The Seveso Directive was modified by Directive 96/82, which widened its scope and simplified it with no distinction between production and storage. The list of named substances has been substantially shortened, a safety management system is now required for the larger sites, and emergency response plans must be tested. Major accident hazards must be taken into account in member states' land-use planning policies, and there are formal requirements for member states' inspection systems. Safety reports and other information received under the Directive are to be made available to the public.

The EC legal framework for waste management includes two approaches: general regulation and specific measures focused on particular types of wastes or on methods of disposal. General regulations are found in Directive 91/689, Dec. 20, 1991, 1991 O.J. (L 377), which prescribes measures of adequate waste management based on a twofold objective: to protect human health against noxious influences caused by the collection, transport, treatment, storage, and disposal of waste and to promote the recovery, recycling, and reuse of waste in order to preserve natural resources. Both objectives establish a permit system to ensure the coherence of waste management, using waste disposal plans, and to control all establishments or undertakings that carry out the main waste operations.

The general framework has been complemented by Regulation 259/93 on the Supervision and Control of Shipments of Waste within, into and out of the EC, Feb. 1, 1993, 1993 O.J. (L 30), which established a notification and control procedure for all shipments of waste. The competent authorities may object to certain movements of waste or impose special requirements for environmental, safety, public policy, or health protection.

Finally, the European Community issued directives in 1990 creating a lengthy series of control procedures both for laboratory research and for release of LMOs. The first Directive, on Contained Use of Genetically Modified Microorganisms (GMM), 90/219/EEC Apr. 23, 1990, 1990 O.J. (L 117), was amended in 1998 to establish four classes of contained uses and the restrictions that apply to each. Directive 98/81/EC, Oct. 26, 1998, 1998 O.J. (L 330), amending and substantially revising Directive 90/212/EEC on the Contained Use of Genetically Modified Microorganisms. The four classes are: Class 1, activities of "no or negligible risk" to human health or the environment; Class 2, "low risk" activities; Class 3, "moderate risk" activities; and Class 4, "high risk" activities. The precautionary principle has been incorporated by requiring that "where there is a doubt as to which class is appropriate for the proposed contained use, the more stringent protective measures shall be applied" unless there is

sufficient evidence according to the competent authority that less stringent measures are justified.

Directive 2001/18/EC, replacing Directive 90/220/EEC, Apr. 23, 1990, 1990 O.J. (L 117), concerns the voluntary release of genetically modified organisms into the environment. The precautionary principle is explicitly incorporated into several provisions. In particular, Art. 4 provides that member states, “in accordance with the precautionary principle, shall ensure that all appropriate measures are taken to avoid adverse effects on human health and the environment which might arise from the deliberate release or the placing on the market of GMOs.” Applicants for release must carry out an environmental risk assessment of the GMO being proposed for authorization.

iv. Noise Pollution

In recent years, society has increasingly recognized excessive noise as a form of pollution. It is both a nuisance and a threat to health. In Europe about ten million people are exposed to noise levels in the environment that may cause hearing loss. The non-binding Stockholm Action Plan addressed the elaboration of norms to combat noise as early as 1972. In addition, several cases submitted to the European Court of Human Rights have alleged that levels of airport noise constitute a violation of their right to privacy and home life guaranteed in the European Convention on Human Rights, Art. 8 (see Section B).

International environmental law primarily regulates two forms of noise pollution: airport noise and urban noise. EC legislation regulates noise generated by air traffic. An EC Directive adopted in 2002 established rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports in order to limit or reduce the number of people significantly affected by the harmful effects of noise. Directive 2002/30/EC, Mar. 26, 2002, 2002 O.J. (L 85/40). The member states had to implement the Directive by Sept. 28, 2003.

A growing number of rules aim to reduce noise from other sources. A general EC directive aims to define a common approach to prevent or reduce the harmful effects of exposure to noise. Directive 2002/49/EC, June 25, 2002, 2002 O.J. (L 189/12) “Environmental noise” is defined as unwanted or harmful outdoor sound created by human activities, including noise emitted by means of transport, road, rail or air traffic, and from sites of industrial activity. Noise indicators are proposed, and states should make and approve noise maps and Action Plans for urban areas and major roads, railways, and airports. The Directive applies to noise emitted by road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment, and mobile machinery. It applies in noise-sensitive areas, such as in public parks and near schools and hospitals. Specific categories of noise

emissions are also regulated by EC legislation: motor vehicles (Directive 70/157/EEC, Feb. 6, 1970, 1970 O.J. (L 42)), agricultural or forestry tractors (Directive 77/311/EEC, Mar. 29, 1977, 1977 O.J. (L 105)), and two or three-wheel motor vehicles (Directives 92/61/EEC, June 30, 1992, 1992 O.J. (L 225) and 2002/51/EC, July 19, 2002, 2002 O.J. (L 252)).

In terms of general environmental policy, on July 22, 2002, the Parliament and the Council adopted the Sixth Community Environment Action Program to apply for the ten years following its adoption. It aims to promote the process of integrating environmental concerns into all Community policies and activities, incorporate new ways of working with the market, and involve citizens, enterprises, and other stakeholders in order to induce necessary changes in both production and public and private consumption patterns that influence negatively the state of the environment. It recognizes that economic globalization means that environmental action is increasingly needed at international level. The key environmental priorities to be addressed by the Community are climate change, nature and biodiversity, environment, health and quality of life, and natural resources and waste. Decision No. 1600/2002/EC, July 22, 2002, 2002 O.J. (L 242)).

2. Other Regional Economic Integration Efforts

Taking a cue from the European Community, which began its environmental programs after the Stockholm Conference, other legal instruments of economic integration proclaim the need to protect the environment. In Africa, the objectives of the Treaty of the Southern African Development Community (Windhoek, Aug. 17, 1992) include the achievement of sustainable utilization of natural resources and effective protection of the environment. Art. 5(d), (g). More widely, Art. 3 of the Constitutive Act of the African Union (adopted July 2000, in force May 26, 2001) identifies its objectives to include the promotion of sustainable development and cooperation in order to raise the living standards of African peoples, cooperation towards the eradication of disease and the promotion of good health, and the development of common African positions on issues of interest to the continent. Environment is not specifically mentioned, but the Executive Council is given authority to make decisions on a range of issues that include mineral resources, agriculture and forestry, water resources, and environmental protection.

The Treaty Establishing the Common Market for Eastern and Southern Africa (Kampala, Nov. 5, 1993) provides for cooperation of the contracting parties in the joint and efficient management and sustainable utilization of natural resources within the Common Market, especially in the management of fresh water resources, fisheries resources (Art. 122), and, in general, in the management of natural resources (Art. 123) and of the

environment (Art. 124). The parties also undertake to develop a collective and coordinated approach to sustainable development and management, rational exploitation, and utilization and the protection of wildlife in the Common Market (Art. 125). These principles are developed in detail so as to provide the states members of the Common Market with precise instructions. The Treaty also integrates environmental protection in agricultural development policy (Art. 130).

In the Western Hemisphere, the Caribbean Common Market (CARICOM), established July 4, 1973, and the Mercado Comun del Sur (MERCOSUR) also seek to eliminate trade barriers in their regions in order to stimulate economic development and have expressed interest in environmental matters. MERCOSUR was established January 1, 1995, between Brazil, Argentina, Paraguay, and Uruguay based on the Treaty of Asuncion of March 26, 1991. Bolivia and Chile are associate members. MERCOSUR aims to establish a common market of free movement of goods, services, labor, and capital. The preamble of the MECOSUR Agreement recognizes that the objective of establishing a common market "must be achieved by making optimum use of available resources, preserving the environment, improving physical links, coordinating macroeconomic policies and ensuring complementarity between the different sectors of the economy, based on the principles of gradualism, flexibility and balance." Prior to UNCED, the parties adopted the Declaration of Canela (Feb. 1992) setting forth a common political position on biological diversity, global climate change, water resources, human settlements, forests, soils, international trade, maritime ocean protection, hazardous wastes, and institutional mechanisms for sustainable development. A Special Meeting on Environmental Issues has worked to analyze environmental legislation in the member states and recommend action to assure adequate environmental protection and harmonization of environmental legislation within MERCOSUR. In 1995 a Working Subgroup on environmental issues was assigned the task of developing common policies for the region.

B. HUMAN RIGHTS

As early as the 1972 Stockholm Conference on the Human Environment, participating states recognized the links between human rights law and environmental protection, stating that environmental degradation hampers the enjoyment of internationally guaranteed human rights. In the Conference's concluding declaration, the participating states referred to the fundamental rights of freedom, equality, and adequate conditions of life in an environment of a quality that permits a life of dignity and well-being. The three headings of freedom, equality, and adequate conditions of life encompass internationally recognized categories of political, civil, economic, and social rights. The UN General Assembly reaffirmed the link-

age between human rights and environmental protection in Resolution 45/94, stating that all individuals are entitled to live in an environment adequate for their health and well-being.

During the three decades since the Stockholm Conference, lawmakers in many countries have drafted constitutional and legislative provisions to add environmental human rights, including the right to an environment of a specified quality, such as “healthy,” “safe,” “secure,” “clean,” or “ecologically sound.” Today, more than 100 constitutions throughout the world guarantee a right to a clean and healthy environment, impose a duty on the state to prevent environmental harm, or call for protection of the environment or natural resources. Constitutional environmental rights are increasingly being enforced by courts in countries from Argentina to India to South Africa. In addition, courts interpreting and enforcing other rights have recognized that violations of them may be the result of a degraded environment. International human rights tribunals also have come to view environmental protection as essential for the enjoyment of certain internationally guaranteed human rights, especially the rights to life, health, home life, and property.

Apart from recognizing that human rights cannot be enjoyed in a degraded environment, there are several other reasons why a rights-based approach is used for environmental protection. First, human rights are maximum claims on society, elevating concern for the environment above a mere policy choice that may be modified or discarded at will. Rights are inherent attributes of human beings that must be respected in any well-ordered society. The moral weight this concept affords exercises an important compliance pull. Second, all legal systems establish a hierarchy of norms. Constitutional guarantees usually are at the apex and “trump” any conflicting norm of lower value. Thus, recognizing a sound environment as a constitutional right should ensure that its protection will be given precedence over other legal norms that are not constitutionally based. Third, at the international level, enforcement of human rights law is more developed than the procedures of international environmental law. The availability of individual complaints procedures to denounce violations of human rights has given rise to extensive jurisprudence in which the specific obligations of states to protect and preserve the environment are detailed.

Most global human rights treaties were drafted and adopted before environmental protection became a matter of international concern. There are thus few references to environmental rights in such instruments, although several treaties refer to pollution, the right to safe food and water, and the right to health. The United Nations has not approved any general normative instrument on environmental rights, although the former UN Commission on Human Rights adopted several resolutions on related matters. Two regional human rights treaties contain specific provisions on the right to environment. The African Charter on Human and Peoples’ Rights (June 26, 1981), Art. 24 provides that “All peoples shall have the right to

a general satisfactory environment favorable to their development.” The African Commission gave a lengthy opinion on the meaning of this protection in *SERAC v. Nigeria*, Case 155/96, Oct. 27, 2001.

Neither the American Declaration on the Rights and Duties of man nor the American Convention on Human Rights contains a right to environment, but the Additional Protocol to the American Convention on Human Rights in the area of Economic, Social and Cultural Rights (Nov. 17, 1988), Art. 11, proclaims:

1. Everyone shall have the right to live in a healthy environment and to have access to basic public services.
2. The States Parties shall promote the protection, preservation and improvement of the environment.

Despite the lack of explicit reference to the environment in the Declaration and Convention, the Inter-American Commission on Human Rights has addressed environmental conditions, especially as these affect the right to health. In *Yanomami v. Brazil* the Inter-American Commission established a link between environmental quality and the right to life in response to a petition brought on behalf of the Yanomani Indians. The petition alleged that the government violated the American Declaration of the Rights and Duties of Man by constructing a highway through Yanomani territory and authorizing exploitation of the territory’s resources. These actions had generated the influx of non-indigenous peoples who brought contagious diseases that remained untreated due to lack of medical care. The Commission found that the government had violated the Yanomani rights to life, liberty, and personal security guaranteed by Art. 1 of the Declaration, as well as the right of residence and movement (Art. VIII), and the right to the preservation of health and well-being (Art. XI). Case 7615 (Brazil), INTER-AM.CH.R., 1984–1985 *Annual Report* 24, OEA/Ser.L/V/II.66, doc. 10, rev. 1 (1985).

The landmark case applying the American Convention to environmental harm came in the *Awes Tingni Mayagna (Sumo) Indigenous Community v. Nicaragua* case, decided by the Inter-American Court. The complaint protested government-sponsored logging of timber on indigenous forest lands in Nicaragua. The government granted the logging concession without consulting the Awes Tingni community, despite having agreed previously to do so. The community alleged violation of the rights to cultural integrity, religion, equal protection, and participation in government. In 1998, the Inter-American Human Rights Commission found in favor of the Awes Tingni and submitted the case to the Inter-American Court. On August 31, 2001, the Court issued its judgment, declaring that the state violated the right to judicial protection (Art. 25 of the American Convention) and the right to property (Art. 21 of the Convention). It unanimously held that the state must adopt domestic laws, administrative

regulations, and other necessary means to create effective surveying, demarcating, and title mechanisms for the properties of the indigenous communities in accordance with customary law and indigenous values, uses, and customs. Pending demarcation of the indigenous lands, the state must abstain from realizing acts or allowing the realization of acts by its agents or third parties that could affect the existence, value, use, or enjoyment of those properties located in the Awas Tingni lands. The Court also awarded reparations.

Like the American Convention, the European Convention for the Protection of Human Rights and Fundamental Freedoms (Nov. 4, 1950) does not mention the environment, but cases nonetheless have been brought to the European Court of Human Rights as a consequence of unredressed environmental harm. The substantive rights invoked include the right to life (Art. 2), the right to privacy and family life (Art. 8), and the right to property (Protocol 1, Art. 1). Most of the early decisions concerned Art. 8 and held that environmental harm attributable to state action or inaction that has significant injurious effect on a person's home or private and family life constitutes a breach of Art. 8(1). The harm may be excused under Art. 8(2), if it results from an authorized activity of economic benefit to the community in general, as long as there is no disproportionate burden on any particular individual; i.e., the measures must have a legitimate aim, be lawfully enacted, and be proportional. States enjoy a certain discretion or "margin of appreciation" in determining the legitimacy of the aim pursued. While in one early case on the right to property, the former European Commission on Human Rights stated that the right to peaceful enjoyment of possessions "does not, in principle, guarantee the right to the peaceful enjoyment of possessions in a pleasant environment." In *Rayner v. United Kingdom* (1986), 47 DR 5, 14, more recently, the Court has found violations when national authorities do not respect constitutional or statutory environmental rights. See ECHR, *Okyay and Others v. Turkey* (App. No. 36220/97, judgment of July 12, 2005) (refusal of Turkish administrative authorities to enforce judicial orders to halt the operations of three thermal-power plants in South-West Turkey found to violate the European Convention on Human Rights, Art. 6).

Nearly all global and regional human rights bodies have considered the link between environmental degradation and internationally guaranteed human rights. In most instances, the complaints brought have not been based upon a specific right to a safe and environmentally sound environment, but rather upon rights to life, property, health, information, and family and home life. Underlying the complaints, however, are instances of pollution, deforestation, water pollution, and other types of environmental harm. The emphasis on rights encourages an integration of democratic values and promotion of the rule of law into broad-based structures of governance. In addition, the existence of international petition procedures allows those harmed to bring international pressure to

bear when governments lack the will to prevent or halt severe pollution that threatens human health and well-being. In many instances, petitioners have been afforded redress, and governments have taken measures to remedy the violation. Petition procedures can help to identify problems and encourage a dialogue to resolve them, including by the provision of technical assistance.

Even where there is a guaranteed right to environment, it still must be balanced against other rights should there be a conflict. In a few instances a specific priority may be established by law. The Constitution of Ecuador, for example, provides in Art. 19 that “the right to live in an environment free from contamination.” The Constitution invests the state with responsibility for ensuring the enjoyment of this right and “for establishing by law such restrictions on other rights and freedoms as are necessary to protect the environment.” Other states may reconcile conflicts through balancing the competing rights.

On a more theoretical level, human rights exist to promote and protect human well-being, to allow the full development of each person and the maximization of the person’s goals and interests, individually and in community with others. This cannot occur without state protection of safe environmental milieu, i.e., air, water, and soil. Pollution not only destroys the environment, but today is considered to infringe human rights law as well.

C. TRADE AND INVESTMENT

International trade law is dominated by the desire to eliminate protectionism and promote free trade. The theory underpinning this system is that free trade and investment can increase consumer choice, reduce the expense of manufacturing consumer goods, thus lowering the price of products, and produce economy of scale resulting in potentially higher returns on investment for producers of goods and services. In addition, advocates of globalization claim that technological advances are rapidly diffused, with social progress stimulated due to sharing of ideas and policies, leading to an enhanced prospect of international harmony and peace. Skeptics of the open market express doubts that free trade will lead to environmental protection, based on the conviction that the economic/financial system today operates with an overwhelming reliance on business decisions driven by short-term financial gains, without regard to social costs, unless the later are imposed through regulation.

The goal of free trade and that of environmental protection may collide, first, because national environmental laws increase production costs for domestic industries. States may seek to avoid the competitive disadvantage that would result for domestic companies, if they were forced to implement expensive environmental protection measures. Many fear a race to the bottom in environmental standard-setting if the free market approach dominates. This was the original basis for European Community

regional action. Without harmonized regional or global norms, domestic countervailing action may be sought against imports not bearing the burden of environmental costs.

Second, states may impose trade restrictions to enforce compliance with international environmental agreements. International environmental treaties have used quantitative restrictions at least since the 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere. Agreements for the protection of wildlife typically use restrictions on export or import between parties based on a permit system. CITES and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal address trade issues directly and as the primary means to achieve the objectives of the agreements.

Trade and the environment began separately, with different aims, but have increasingly converged, as well as collided. Free traders fear that environmental regulations will become pretexts to close markets. Environmentalists fear that free trade will eliminate or restrict environmental protection. Both international and unilateral measures have been taken to try and reconcile the differences. The multilateral responses are described in the following sections.

1. GATT/WTO

The General Agreement on Tariffs and Trade (GATT) of 1947, revised in 1969, provides the legal framework for the use of trade restrictions. GATT was intended to be the normative framework for an international trade organization, a goal that was achieved only in 1994 with the creation of the World Trade Organization.

GATT generally treats environmental protection measures as undesirable trade restrictions. It accepts customs duties and other charges applied in a non-discriminatory fashion, but Art. III requires that imported products be treated no less favorably than “like” products of national origin with respect to all “regulations and requirements affecting the internal sale” of such products. Thus, a regulation on product safety or quality, such as auto emission standards, applied neutrally to domestic and imported products is permissible under GATT. Massive exportation of products that have a low price due to cheap and highly polluting production methods is not considered dumping by GATT and therefore may not be countered by countervailing duties, nor may states limit the imports. Further, environmental taxes for goods in transit, such as road use fees to clean up increased air pollution, may run afoul of GATT Art. V(3), which guarantees freedom of transit.

Art. XI of GATT generally prohibits quantitative restrictions (quotas or bans) on imports and exports. In circumstances in which they may be justified, for example under one of the exceptions in Art. XX, Art. XIII requires that quantitative import or export restrictions be non-discriminatory in respect to all the member states. It provides that no prohibition

or restriction shall be applied by any contracting party on the importation of any product from the territory of any other contracting party or on the exportation of any product destined for the territory of any contracting party, unless the importation of the like product of all third countries or the exportation of the product to all third countries is similarly prohibited or restricted.

A major issue in many trade disputes is the classification of a state's action as a regulation affecting "processes and production methods" (PPMs) rather than the characteristics of the product. Product regulations concern the design, characteristics, and uses of particular products. GATT grants governments broad discretion to set product standards and even ban their sale. The characteristics of fuel economy of automobiles, for example, is accepted as a legitimate product standard, so long as it is non-discriminatory in application. The issue most often debated in this respect is whether products are "like" products that must be treated identically. Notably, the Report of the Appellate Body, in a case involving France's regulations severely limiting the use of certain kinds of asbestos, found that the dangers associated with the particular type of asbestos made it a different product than less hazardous forms of the product or competing materials. See *European Communities, Measures Affecting Asbestos and Asbestos-Containing Products*, Report of the Appellate Body, WT/DS135/AB/R (Mar. 12, 2001), para. 192.

PPM regulations, in contrast to product regulations, set standards on pollution emissions or manufacturing techniques and substances used in making a product (e.g., CFCs). It has been held that PPM measures do not fall under GATT Art. III governing the domestic sale of a product, but under Art. XI, quantitative restrictions on importation. As such, they violate GATT unless the state's regulation can fall within an exception in Art. XX, discussed below. PPM trade measures may concern transboundary pollution; management of transboundary living resources; global environmental concerns, like greenhouse gases; or conditions in the affected country or countries. The fourth is the most likely to fail under GATT, because it attempts to impose environmental laws extra-territorially on foreign sovereigns without an international dimension to the issue.

Many common PPMs seek to enforce resource conservation agreements or alleviate global problems like the ozone layer or climate. Given their beneficial aim, but recognizing their harmful impacts on trade, PPM measures have been the most difficult trade/environment disputes in GATT and WTO. The early refusal to liberally apply Art. XX exceptions led to many concerns about the WTO. With more environmentally conscious application of the exceptions, many restrictions can be upheld.

An impermissible trade restriction under GATT may still be justified under Art. XX, which reads:

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable

discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures: . . .

- b) necessary to protect human, animal or plant life or health; . . .
- g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption.

Much of the case law about trade and environment, discussed below, has concerned the scope of the Article XX exceptions and its introductory language, called the “chapeau.”

GATT fundamentally changed with adoption of the Marrakech Agreement establishing the World Trade Organization (Apr. 14, 1994). Environmental concerns appear in the preamble where the parties recognize that their relations should be conducted so as to allow for the optimal use of the world’s resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development. Article XIV of Annex IB entitled General Agreement on Trade in Services provides for the possibility of general exceptions for specific environmental purposes: “nothing in this Agreement shall be construed to prevent the adoption or enforcement by any Member of measures . . . b) necessary to protect human, animal or plant life or health.” Similarly, Annex 1C, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) states that members may, in formulating or amending their laws and regulations, adopt measures necessary to protect human health and nutrition, and to promote the public interest in sectors of vital importance in their socio-economic and technological development, provided that such measures are consistent with the provisions of the Agreement. Art. 8. They may exclude from patentability those inventions whose commercial exploitation it is necessary to prevent in order to protect *ordre public*, or morality, including the protection of human, animal or plant life or health, or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law. Art. 27(2). Members also may exclude from patentability plants and animals other than micro-organisms and biological processes for the production of plants and animals other than non-biological and micro-biological processes. Art. 27(3)(b).

The WTO Sanitary and Phytosanitary Agreement (SPS) allows countries to apply sanitary and phytosanitary measures to ensure that plants and animals are protected from pests and diseases and that food is safe for consumers. By their nature they act to restrict trade. The purpose of the Agreement is not to limit the right of states to set their own levels of health

protection, but to require transparent decisionmaking to avoid disguised barriers to trade. The Agreement encourages the harmonization of sanitary and phytosanitary measures through the adoption of international standards, such as those provided by the Codex Alimentarius Commission. See Chapter III, Section B.1 Countries may adopt higher standards provided they are based on a risk assessment consistent with the requirements of the SPS Agreement. To be consistent, the national measure must be applied only to the extent necessary to protect human, animal, or plant life or health, be based on scientific principles, and not be maintained without sufficient scientific evidence. A measure also must not arbitrarily or unjustifiably discriminate between WTO member states or constitute a disguised restriction on international trade. Measures should be based on an appropriate risk assessment process, taking into account available scientific evidence, as well as relevant economic, ecological, and environmental conditions. Finally, any measure that a party does impose should not be more trade restrictive than required to achieve the appropriate level of sanitary or phytosanitary protection. SPS Agreement, Arts. 3, 5.

Several cases have been brought against states to challenge their trade restrictions aimed at environmental protection. The GATT exceptions to free trade contained in Art. XX cover only human or animal health and the conservation of exhaustible natural resources. They do not mention protection of non-living environmental sectors, such as water or air.

A GATT panel has found that Art. XX(b) can only be used for a measure that is necessary and that “entails the least degree of inconsistency with other GATT provisions.” The necessity requirement is primary, and the panels appear to have misread the exception, which requires only that the measure be necessary to protect the resource, not that the trade restriction is necessary.

The exception contained in Art. XX(g) (protection of exhaustible natural resources), has been held to apply to dolphins, gasoline, and clean air. See, for example, the *Final Report of the Panel in the Matter of Canada’s Landing Requirement for Pacific Coast Salmon and Herring*, Oct. 16, 1989, para. 7.02; *United States—Standards for Reformulated and Conventional Gasoline*, WT/DS2/AB/R, Apr. 29, 1996.

In the *Reformulated Gasoline Case*, the plaintiff states argued against the United States that a measure could only be “related to” or “primarily aimed at” conservation, if the measure both primarily was intended to achieve a conservation goal and had a positive conservation effect. The original panel found no direct connection between less favorable treatment of imported gasoline that was chemically identical to domestic gasoline and the U.S. objective of improving domestic air quality and thus concluded that the measure was not primarily aimed at the conservation of natural resources. The Appellate panel disagreed with this conclusion, finding that it was the purpose of the measure as a whole that had to be tested. A GATT

panel stated that Article XX(g) can only be used for a measure that is “primarily aimed at” rendering domestic conservation restrictions effective. *Report of the Panel, Canada—Measures Affecting Exports of Unprocessed Herring and Salmon*, Nov. 20, 1987, para. 4.6. It relied on an earlier case in which it “acknowledged that the conservation of natural resources encompasses broader environmental concerns reflecting both economic and non-economic [ecological] interests.” Even if justified, however, an Art. XX exception cannot be applied if it constitutes arbitrary discrimination, unjustifiable discrimination, or a disguised restriction on international trade. A measure may be considered to be the last mentioned if less burdensome alternatives were available.

The most well-known environmental cases at the WTO are probably the tuna-dolphin cases against the United States, involving issues of the application of Article XX(b) and XX(g). Mexico filed the first complaint, concerning the U.S. Marine Mammals Act, which forbid importation of tuna caught with nets that also catch and kill dolphins. The objective of the U.S. law was the protection of cetaceans, particularly dolphins, from indiscriminate forms of fishing that led to large loss of marine mammal life without regard to the place of the fishing. The action was not pursuant to treaty, but involved unilateral sanctions imposed by the United States. The panel held that the import ban imposed on Mexico violated Art. XI of GATT and was not a permissible exception under Art. XX. The panel refused to accept process standards (the method of catch) related to the fish products as exceptions under Art XX(b) and (g) because then

each contracting party could unilaterally determine the life or health protection policies from which other contracting parties could not deviate without jeopardizing their rights under the General Agreement. The General Agreement would then no longer constitute a multilateral framework for trade among all contracting parties but would provide legal security only in respect of trade between a limited number of contracting parties with identical internal regulations.

The panel also declared that the exceptions cannot be used for extra-territorial measures, i.e., protection of dolphin outside the jurisdictional limits of the state taking the measure. The panel added that the appropriate way to protect such resources is through multilateral negotiation of an environmental agreement, not through unilateral measures threatening market access. The GATT Council was not asked to adopt the panel report, because Mexico and the United States attempted to negotiate an environmental agreement to ensure proper dolphin protection.

Tuna II, a 1994 case brought by the EC against the United States, also found United States actions improper, but partly modified Tuna I. The United States said that the law prohibiting imports of European processed tuna, which had been harvested in violation of U.S. law by non-European

countries, was necessary to protect the environment and especially the global commons. The panel said that in the ordinary meaning of “necessary,” a member could not justify a GATT inconsistent measure if an alternative GATT-consistent measure was available that the member could reasonably be expected to employ. Significantly, Tuna II did accept the permissibility of extra-territorial laws affecting the international commons. The U.S. policy to conserve dolphins in the Eastern tropical Pacific Ocean was deemed within the range of policies covered by GATT Art. XX(g).

A 1998 dispute again involved U.S. trade restrictions, this time measures designed to protect endangered sea turtles. All seven species of sea turtles are listed in Appendix I of CITES, and all of the parties to the dispute are signatories to CITES. In the United States, CITES is implemented by the Endangered Species Act of 1973, Public Law No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531–1543 (1988)). The Sea Turtle Conservation Act, or § 609 of Public Law No. 101–162, requires the United States to negotiate with countries whose fleets appear to threaten sea turtle populations, after which it may restrict the importation of shrimp harvested with commercial fishing technology that may adversely affect sea turtles. To export shrimp to the United States, as of May 1996, all countries in whose waters shrimp and sea turtles coexist had to be certified by the U.S. State Department as having and enforcing legislation requiring turtle excluder devices on commercial shrimp trawlers. The shrimp/turtle case was brought to the WTO by India, Malaysia, Pakistan, and Thailand, who objected to the measures as extra-territorial and unilateral. Sixteen countries and the EU joined as third parties. On April 6 a panel ruled that the United States violated its obligations under GATT, and on July 23, 1998, the United States appealed. *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, WTO Panel established Feb. 25, 1997, WT/DS58/R and Corr.1, as modified by the AB Report, WT/DS58/AB/R, adopted Nov. 6, 1998.

The Appellate Body on October 12, 1998, upheld the shrimp ban decision against the United States, but overturned several aspects of the panel’s decision. Most importantly, the Appellate Body agreed with the United States that it had a right to adopt its restrictions for environmental purposes. In looking at the contemporary context, it affirmed that the term “exhaustible natural resources” is not static in its content but is rather “by definition, evolutionary.” The words “must be read . . . in the light of contemporary concerns of the community of nations about the protection and conservation of the environment.” In this and other respects, the ruling indicated greater sensitivity to environmental concerns:

We have not decided that the protection and preservation of the environment is of no significance to the WTO. Clearly it is. We have not decided that the sovereign nations that are members of the WTO cannot adopt effective measures to protect endangered species, such

as sea turtles. Clearly, they can and should. And we have not decided that sovereign states should not act together bilaterally, plurilaterally, or multilaterally, either within the WTO or in other international fora, to protect endangered species or otherwise protect the environment. Clearly they should and do.

The United States failed, however, to ensure that the ban was imposed in a non-discriminatory manner. The ruling set down a number of criteria to ensure that environmental trade measures do not discriminate between WTO members. The Dispute Settlement Body adopted the decision, WT/DS58/15, July 15, 1999.

The United States revised its guidelines, but on October 23, 2000, Malaysia invoked Art. XXI.5 to assert U.S. non-compliance with the decision in the Shrimp/Turtle case. In a report of June 15, 2001, the panel found the measure to be in violation Art. XI.1, but justified by Art. XX "as long as" there were on-going serious good faith efforts to reach a multilateral agreement on the matter. Malaysia appealed, contending that the panel did not adequately scrutinize the Revised Guidelines for conformity with the WTO Agreement, that, in effect, it is "a new and different measure" that must be subject to *de novo* consideration. The Appellate Body found the U.S. measure to be a new and different measure, but held that neither the panel nor the Appellate Body should reopen issues that were previously decided and thus *res judicata*. The issue was the application of the U.S. statute and whether it was being applied through the new measure in a way that constituted unjustified discrimination. According to the Appellate Body, the United States had been found in violation of GATT in part because it treated WTO members differently, cooperating with Caribbean and Western Atlantic states to conclude an agreement, while failing to negotiate with other states. The differential treatment was held "plainly discriminatory." To comply, all exporting countries had to be given similar opportunities to negotiate an international agreement. Requiring an agreement to be concluded would not be justified, because it would give any country a veto over U.S. measures. "The protection and conservation of highly migratory species of sea turtles . . . demands concerted and cooperative efforts on the part of the many countries whose waters are traversed in the course of recurrent sea turtle migrations." The "need for, and the appropriateness of, such efforts have been recognized in the WTO itself, as well as in a significant number of other international instruments and declarations." Yet, while a multilateral approach "is strongly preferred . . . it is one thing to *prefer* a multilateral approach in the application of a measure that is provisionally justified under one of the subparagraphs of Article XX of the GATT 1994; it is another to require the *conclusion* of a multilateral agreement as a condition of avoiding 'arbitrary or unjustifiable discrimination' under the chapeau of Article XX. We see, in this case no such requirement." Both the panel and Appellate Body contrast the

conditionality of the original measure with the flexibility of the new measures, because “comparable in effectiveness” is less rigid than “essentially the same.”

The Appellate Body found this flexibility sufficient to avoid the measure being arbitrary or unjustifiable discrimination. Further the new U.S. Guidelines at issue noted that sea turtles require protection throughout their life-cycle, not only when they are threatened by commercial shrimp trawl harvesting. So, in making certification decisions, the Department had to take fully into account other measures, such as protection of nesting beaches and other habitat, prohibitions on taking sea turtles, national enforcement and compliance programs, and participation in any international agreement for the protection and conservation of sea turtles. *United States—Import Prohibition of Certain Shrimp and Shrimp Products, Report of the Appellate Body*, WT/DS58/AB/RW, Oct. 22, 2001, 41 ILM 149 (2002).

In other cases, invocation of the precautionary principle has proved problematic. In the beef hormone dispute, the scientific evidence submitted by the EU was deemed insufficient to justify the ban on beef containing hormones in part because the Codex Commission had adopted maximum residue limitations for the hormones in question, thus approving their use. Finding that there was no scientific evidence in support of the EU action, the panel rejected the precautionary principle as inapplicable, instead holding that members must base their actions on a risk assessment adopting the criteria laid down by the SPS Agreement. According to the panel, unilateral restrictions should be allowed, as long as there is a scientific justification, but if there is no scientific evidence, the ban could not be “based on” science. The panel rejected the EU scientific interpretations as being “minority views” in the scientific community.

As long as measures are applied equally to domestically produced and imported products (national treatment rule) and do not discriminate against imports from whatever sources (most-favored nation rule), many environmental measures will avoid any challenge under GATT. The difficult issue is that one country’s environmental protection measure may be seen by another as disguised protectionism. GATT has been notified of some 300 environmental regulations concerning hazardous products, environmental packaging, marking and labeling requirements, waste disposal regulations and requirements. Any or all of these could be challenged.

In sum, the case law has established several criteria for permissible trade-related environmental measures.

First, the state seeking to justify a trade restriction under Art. XX(b) (protection of human, animal, or plant life or health) is tested under a three-part analysis:

1. Is the substance of the policy of the measure in question the protection of human, animal, or plant life or health;

2. Is the measure for which the exception being invoked necessary to protect that aim;
3. Is the measure applied consistently with the chapeau, avoiding arbitrary or unjustifiable discrimination and/or a disguised restriction on international trade.

In respect to Article XX(g), the legality of environmental measures that restricts trade has been tested by asking:

- (1) Does the law and policy relate to the conservation of exhaustible natural resources,
- (2) Are the measures made effective in conjunction with restrictions on domestic production or consumption, and
- (3) Do the measures constitute arbitrary discrimination, unjustifiable discrimination or a disguised restriction on international trade, in violation of the heading of Art. 20?

While the case law has gradually become more favorable to environmental protection, the WTO has been criticized in the past for its emphasis on trade and lack of expertise in and understanding of environmental problems. The Committee on Trade and Environment has produced few results of any substance. Its primary recommendation has been the extension of its mandate, something that was approved in 1996 at the Ministerial Meeting held in Singapore. The WTO has improved its transparency, however, agreeing to release more documents to the public and to set up an Internet site to provide greater access. The Secretariat has instituted symposia for NGOs and granted observer status at the 1996 and 1998 Ministerial Conferences. An Appellate Body approved the acceptance of NGO *amicus* briefs in disputes. Finally, the 2002 Doha Ministerial Meeting adopted a declaration that contains a renewed commitment to sustainable development, sets goals for the WTO Committee on Trade and Environment and specifically agrees to address fisheries subsidies and to reduce or eliminate tariff and non-tariff barriers to environmental goods and services.

2. NAFTA

Like the GATT/WTO, NAFTA seeks to eliminate trade barriers and avoid disguised restrictions on trade. Chapter 7B on sanitary and phytosanitary standards (SPS) and Chapter 9, which concerns other technical barriers to trade, including environmental product standards, attempt to balance environmental and free trade concerns, in the process creating some contradictions in the text. On the one hand, each party has the right to set and maintain environmental health and safety standards consistent with the level of protection it alone deems appropriate. Art. 712. On the other

hand, the measures must be based on scientific principles. Art. 712.3. NAFTA Art. 715(4) encompasses the precautionary approach by allowing provisional measures to be adopted where relevant scientific evidence is insufficient. The Agreement on Technical Barriers to Trade allows each party to establish levels of health and environmental protection that it considers appropriate in accordance with risk assessment. Arts. 904(2) and 907(2). Standards-related measures concerning the environment may include import prohibitions (Art. 904(1)), but parties need to avoid arbitrary or unjustifiable distinctions.

The SPS Agreement also provides that national measures that conform to international standards, such as those established by the Codex Alimentarius Commission, are presumptively valid (on the Codex, see Chapter III, Section B.1). More stringent measures may be approved. NAFTA Art. 712.5 requires that SPS standards be “necessary for the protection of human, animal or plant life or health” and can be applied only to the extent “necessary” to achieve the chosen level of protection, echoing the language of GATT Article XX. Other limitations require that the measures not be maintained where there is no longer a scientific basis for them, not be arbitrarily or unjustifiably discriminatory against imported products, and not create a disguised restriction on trade. The party challenging a regulation has the burden of proof, creating a soft presumption that regulation is valid. Either of the parties or the panel may convene a panel of technical experts to render advisory opinions on the scientific issues involved. Art. 1114 addresses the concern about a “race to the bottom.” It provides:

The parties recognize that it is inappropriate to encourage investment by relaxing domestic health, safety or environmental measures. Accordingly, a Party should not waive or otherwise derogate from, or offer to waive or otherwise derogate from, such measures as an encouragement for the establishment, acquisition, expansion or retention in its territory of an investment of an investor. If a Party considers that another Party has offered such an encouragement, it may request consultations with the other Party and the two Parties shall consult with a view to avoiding any such encouragement.

Due to concerns about the lack of specificity in NAFTA, an environmental side accord was signed September 13, 1993, by the three governments. The NAFTA Side Agreement (Sept. 13, 1993) addresses environmental concerns in more detail. It is highly likely that the agreement would not have been approved without its protections. It establishes a trilateral North American Commission for Environmental Cooperation (NACEC) designed to (1) facilitate cooperation between NAFTA countries on environmental issues; (2) serve as a forum for regular ministerial-level meetings; (3) provide an independent secretariat to report regularly on significant envi-

ronmental issues confronting NAFTA parties; (4) ensure that environmental enforcement remains a priority in all three countries, including provision for an annual enforcement activity report; (5) coordinate with trade officials in all three countries on any NAFTA related environment issues; and (6) ensure that there are opportunities for public participation in the development and implementation of environmental laws and programs in all three NAFTA countries.

The agreement requires each NAFTA country to prepare periodic reports on the state of the environment and make these reports available to the public. Each state party must assess environmental impacts “as appropriate” and consider stopping exports to NAFTA partners of any pesticide or toxic substance whose use is banned within the exporting nation’s borders. In addition, the NAFTA parties commit themselves to guarantee their citizens access to national courts to undertake enforcement actions and to seek redress of harm. They also agree to ensure the openness of judicial and administrative proceedings and transparent procedures for the creation of environmental laws and regulations. They further seek to limit trade in toxic substances that they have banned domestically.

The Commission on Environmental Cooperation (CEC) from all three countries will advise the Council in its deliberations. The Commission acts to consider the environmental implications of process and production methods and to promote greater public access to information about hazardous substances. It also considers ways to promote the assessment and mitigation of transboundary environmental problems and is an avenue for NAFTA dispute settlement panels to obtain environmental expertise. As described in Chapter III, citizens of all three countries may make submissions to the Commission on their concerns related to the full range of environmental issues, including any “persistent pattern of failure . . . to effectively enforce environmental laws or regulations.”

NAFTA’s CEC has a number of programs and activities related to environmental protection: the North American Bird Conservation Initiative (a tri-national coalition of over 250 government agencies and NGOs.); North American Marine Protected Areas Network to enhance and strengthen the conservation of marine biodiversity in critical habitats throughout North America by creating functional linkages and information exchanges; Global Program of Action for the Protection of the Marine Environment from Land-based Activities in North America; and the North American Pollutant Release and Transfer Register Project. The last-mentioned aims to ensure citizen access to accurate information about the release and transfer of toxic chemicals from facilities in their communities. Other programs include the Air Quality Program; Sound Management of Chemicals Program; and Children’s Health and the Environment.

Concerning investment, NAFTA Art. 1114(1) provides: “Nothing in this Chapter shall be construed to prevent a Party from adopting, maintaining or enforcing any measure otherwise consistent with this Chapter that it

considers appropriate to ensure that investment activity is undertaken in a manner sensitive to environmental concerns." The second paragraph of the same article recognizes that it is "inappropriate to encourage investment by relaxing domestic health, safety or environmental measures." Accordingly a party should not "waive or otherwise derogate from, or offer to waive or otherwise derogate from, such measures as an encouragement for the establishment, acquisition, expansion or retention in its territory of an investment of an investor." At the same time, Chapter 11 seeks to protect the security of foreign investment.

D. MILITARY MATERIALS AND ACTIVITIES

Throughout history, militaries have deliberately harmed the environment as a wartime strategy. From the Roman salting of lands around Carthage during the Third Punic War to Iraqi-set oil fires during the 1991 Gulf War, nature and its resources have been targets of attack or turned into weapons. Throughout the 20th century, the scope for destruction increased with the development of weapons of mass destruction. The potential for harm was evidenced during the Vietnam War when widespread use of chemical defoliants destroyed entire ecosystems and led to public health concerns in the United States and Vietnam due to the exposure of individuals to the chemicals used. To many observers, the severity of the environmental impacts in Vietnam revealed a need for new international law to mitigate the ecological consequences of armed conflict. Peacetime military activities, including weapons testing, pollution from military vessels, and contamination of land around military bases, also give rise to environmental concerns. Yet most environmental agreements and national laws exclude the military from their scope.

Environmental damage during war threatens harm to present and future living organisms. Those who live in or near a combat zone may ingest persistent toxins or be exposed to radiation or other carcinogenic or mutagenic substances. Military action may contaminate air, water, and soil or disrupt ecological processes, generating streams of refugees who flee the damage only to find new forms of environmental degradation associated with large refugee camps. Ecological damage also can hamper or prevent the rebuilding of communities after cessation of the conflict.

Effectively summing up these consequences, Principle 24 of the Rio Declaration affirms that warfare is inherently destructive of sustainable development. The Declaration calls on states to respect international law concerning the environment in times of armed conflict and cooperate in its further development, as necessary. The current law of war contains principles that can apply to protect the environment. They are found in customary international law and codified in the Hague Conventions of 1899 and October 18, 1907, and the Geneva Conventions of August 12, 1949. In 1976, states adopted the first treaty specifically aimed at protecting the

environment against military assault: the Environmental Modification Convention (ENMOD, Dec. 10, 1976). The following year, Additional Protocol I to the 1949 Geneva Conventions made further progress. Despite these developments, some claim that existing law is inadequate, and further legal measures are needed to ensure environmental protection during armed conflicts.

1. Customary and Treaty Law of Armed Conflict

State practice and religious traditions have long prohibited deliberate attacks on certain features of the environment. Jewish and Muslim texts, for example, enjoin the destruction of trees during war. Grotius, in his classic *On the Law of War and Peace*, contended that the law of nations forbid the poisoning of water and in a chapter on “moderation in laying waste” promoted the principle of military necessity. Until the U.S. Civil War (1861–1864), however, states had not approved any agreement defining the laws of war. During that conflict the U.S. army adopted the Lieber Code of 1863, which imposed rules on the treatment of civilians and prisoners of war and limits on the means and methods of warfare. Four principles emerged from the Lieber Code to become generally accepted in state practice and international agreements: the principle barring unnecessary damage (the principle of military necessity); proportionality (actions should not cause excessive or indiscriminate damage in relation to the military advantage); prevention of unnecessary suffering; and discrimination between civilian and military targets. These principles have been elaborated in many treaties establishing the law of armed conflict, including agreements on treatment of wounded and prisoners of war, bans on certain weapons, the duties of occupying powers, and specific rules for different theaters of conflict (land, air, sea). Among the disparate legal instruments governing armed conflict are several that contain provisions relevant to environmental protection:

- St. Petersburg Declaration Renouncing the Use, in Time of War, of Explosive Projectiles under 400 Grammes in Weight, St. Petersburg, Nov. 29, 1868, AM. J. INT'L L. 1 (Supp.) 95;
- Hague Convention (No. IV) Respecting the Laws and Customs of War on Land (1907), The Hague, Oct. 18, 1907, 36 Stat. 2277, TS No. 539;
- Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases and of Bacteriological Methods of Warfare (1925), Geneva, June 17, 1925, 26 UST 571, TIAS No. 8061, 14 ILM 49 (1975);
- Convention Relative to the Protection of Civilian Persons in Time of War (Geneva, Aug. 12, 1949), 6 UST 3516, TIAS No. 3365, 75 UNTS 287 (Geneva Convention (IV)) and Additional Protocol I Relating

to the Protection of Victims of International Armed Conflicts, June 8, 1977, 1125 UNTS 3, reprinted in 16 ILM 1391 (1977);

- Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Moscow, Aug. 5, 1963), 480 UNTS 43 (1963) and Comprehensive Test Ban Treaty (Sept. 24, 1996);
- Convention on Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD);
- Protocols II and III to the 1980 UN Convention on Certain Conventional Weapons, restricting mines and incendiary weapons;
- Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Paris, Jan. 13, 1993, 32 ILM 800 (1993).

Most of these texts do not explicitly mention the environment, but they contain general principles and provisions that may be applied in order to promote environmental protection. Any action lacking a military purpose is unlawful.

The 1907 Hague Convention, with its detailed and annexed regulations, prohibits the use of poison or poisoned weapons and requires occupying states to refrain from overexploiting resources such as forests. Convention (No. IV) Respecting the Laws and Customs of War on Land, with Annex of Regulations (The Hague, Oct. 18, 1907), Arts. 23(a), 55, 36 Stat. 2277 (1911). These rules emerged from a general agreement of the parties that “the right of belligerents to adopt means of injuring the enemy is not unlimited.” Hague Convention (IV) Respecting the Laws and Customs of War on Land, Art. 22 Annex, § 2, ch. I. Several customary international norms enshrined in the Hague Convention could provide potentially far-reaching environmental protection, including the fundamental principles of necessity, proportionality, and discrimination between military and civilian targets.

Perhaps most importantly, the preamble to the Convention recites the well-known Martens Clause which reads:

[u]ntil a more complete code of the laws of war has been issued, the High Contracting Parties deem it expedient to declare that, in cases not included in the Regulations adopted by them, the inhabitants and the belligerents remain under the protection and the rule of the principles of the law of nations, as they result from the usages established among civilized peoples, from the laws of humanity, and the dictates of the public conscience.

The wording of the Clause has been echoed in a number of subsequent treaties, including the 1949 Geneva Conventions, the 1977 Additional Protocols I and II, and the 1980 Convention on Certain Conventional Weapons. In the aftermath of the 1991 Gulf War, the ICRC and the

General Assembly asserted the relevance of the Martens Clause to environmental protection.

The Geneva Conventions of 1949 built on the provisions of the 1907 Hague Regulations and, like them, protect property, including property owned collectively or by the state or other public authorities. Art. 147 of Geneva Convention (IV) on the protection of civilians includes among “grave breaches” of the Convention any extensive destruction and appropriation of property not justified by military necessity and carried out unlawfully and wantonly. One unresolved question is whether or not the term “property” includes public goods, such as water resources, public lands, and air.

Other treaties include specific measures relating to the environment, *inter alia*, Art. I of the Convention on Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD); Arts. 35(3) and 55(1) of the 1977 Additional Protocol I to the Geneva Convention; and Art. 2 of Protocol III to the United Nations Conventional Weapons Convention. ENMOD is primarily concerned with the use of nature as a weapon of war. Environmental modification, defined in Art. II, means “any technique for changing—through the deliberate manipulation of natural processes—the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.” Art. 1 prohibits all “hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury” to the opposing side. A contemporaneous understanding of the Conference of the UN Committee on Disarmament defined widespread to mean an area on the scale of several hundred square kilometers. Long-lasting means a period of months, approximately a season, while severe is defined as “involving serious or significant disruption or harm to human life, natural and economic resources or other assets.”

Additional Protocol I to the 1949 Geneva Convention significantly advanced environmental protection during warfare. Art. 35(3) prohibits employing methods or means of warfare “which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment” without mentioning potential impacts on humans. Art. 55(1) repeats that care should be taken to avoid such harm, but adds that “this protection includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population.” Art. 55(2) further specifies that attacks against the natural environment by way of reprisals are prohibited.

Without mentioning the environment specifically, other provisions of Protocol I may provide additional protection. Art. 52, which concerns the general protection of civilian objects, prohibits attacks on objects indispensable to the survival of the civilian population, such as food, agricultural areas, crops, livestock, drinking water installations and supplies, and

irrigation works. Art. 56 affords protection to works and installations containing dangerous forces, namely dams, dykes, and nuclear electrical generating stations. Some of these protections were notably referred to in the UN Convention on International Watercourses (May 21, 1997, 36 ILM 700 (1997)), whose Art. 29 refers to the protection afforded international watercourses and related installations, facilities, and other works during international and non-international armed conflicts.

Additional Protocol I to the Geneva Convention applies only to land warfare and to sea or air warfare that affects the land. The Protocol does not protect the atmosphere generally or the air above the land, if the land below is not affected. In addition, Art. 35(3) and Art. 55 set a high threshold for prohibited acts, only banning those that cause "widespread, long-term and severe damage." Protocol I defines "long-term" to be a period of decades. The Conference Committee clearly stated that the terms of Protocol I must be interpreted in accordance with the meaning specified in the Protocol and not in the light of similar terms contained in other instruments, such as ENMOD.

The majority of states are parties to Protocol I, but it has not attracted support among several key states. The rules embodied in the Protocol can only be binding on non-signatories if the rules constitute or become customary international law. A further limiting factor arises from the fact that Protocol I applies only to international armed conflicts. Additional Protocol II to the Geneva Conventions specifically applies to non-international armed conflicts and contains no provision concerning the environment.

The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (Paris, Jan. 13, 1993) contains far-reaching provisions on control of national chemical production facilities and international verification of state obligations. Contracting states must destroy all chemical weapons and all production facilities within ten years of the Agreement's entry into force. Each state party must provide access to any chemical weapons destruction facility for the purpose of on-site systematic verification and monitoring. The treaty covers all toxic chemicals and their precursors, listed in three schedules or annexes.

The Convention is the first agreement to apply verification procedures to the civilian chemicals industry. All locations at which chemical weapons are stored or destroyed are subject to systematic verification through on-site inspection and monitoring with on-site instruments. The procedures allow international inspectors to examine chemical facilities on request of another signatory state. More detailed measures concerning the elimination and disposal of chemical reserves are dealt with by the Organization for the Prohibition of Chemical Weapons established by Art. VIII of the Convention.

Implementation of the Agreement raises significant environmental problems due to the number of weapons and technical difficulties involved.

The Convention includes some specific obligations regarding the environmental implications of the destruction of chemical weapons. Art. VII(3) provides that each state party shall assign the highest priority to ensuring the safety of people and to protecting the environment as the Treaty is implemented. Thus, a state party may not refuse to implement the Convention on environmental grounds, but must reconcile environmental protection with the goals of the Convention to the fullest extent possible. A similar provision is included in the Convention on the Prohibition of the Development, Production and Stockpiling of Biological and Toxic Weapons and Their Destruction of Apr. 10, 1972, 1015 UNTS 163. The latter provides that "in implementing the provisions of this Article all necessary safety precautions shall be observed to protect populations and the environment." Art. II(2).

The Chemical Weapons Convention refers to national standards for safety and emissions in regard to the destruction of chemical weapons. Art. IV(10). In principle, each state party may decide how it shall destroy chemical weapons consistent with its obligation to place safety and environmental protection at the forefront. The weapons must be destroyed, however, in designated facilities suited for the task, and states may not eliminate agents through dumping in water, land burial, or open-air burning. Old chemical weapons, i.e., those produced before 1925 and those produced between 1925 and 1946, which have deteriorated to such extent that they can no longer be used as chemical weapons, are to be treated as toxic waste under national and international regulation according to paragraph B.6 of Part IV(B) of the Verification Annex. Finally, the Convention indicates that a state party bears responsibility for all chemical weapons it abandoned on the territory of another state party. The explicit obligations are, however, limited. The interplay with environmental conventions, such as the Basel and Bamako Conventions dealing with the transboundary transport of hazardous wastes, means that, in general, the transboundary shipment of war materials, in order to destroy them, is permitted only in very limited circumstances. Other conventions, such as the Geneva Convention on Long-Range Transboundary Air Pollution, may limit the disposal of weapons inland and abroad.

Several bilateral agreements have been concluded that also may contribute to the environmentally sound destruction of chemical weapons. In the United States-Russian Agreement Concerning the Safe, Secure and Ecologically Sound Destruction of Chemical Weapons (July 30, 1992), the United States agreed to provide up to \$55 million to assist Russian chemical weapons destruction. An agreement of December 1992 between Russia and Germany enabled the construction of a plant to destroy specific materials. Similarly, Sweden agreed to assist Russia by examining the risks associated with the storage and destruction of the Russian chemical stockpile.

Other specific weapons systems have been restricted because of their indiscriminate effects or the excessive injuries they cause. In particular,

nuclear weapons and anti-personnel land mines have been targeted by the international community. In 1996, the conference of state parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons adopted a protocol on the use of mines, booby-traps, and other devices. Protocol II to the Convention on Prohibitions on the Use of Certain Conventional Weapons which may be Deemed to be Excessively Injurious or to have Indiscriminate Effects (Geneva, May 3, 1996), 35 ILM 1206 (1996). The Protocol applies to international and to internal armed conflicts. It limits the types of weapons that can be used and calls on each contracting party to clear, remove, or destroy all mines, booby-traps, and similar devices.

Another weapons treaty, the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction (Oslo, Sept. 18, 1997), mentions the environment, although its purpose is to end the casualties caused by land mines. According to Art. 5 of the Convention, each state party must clear all mines in areas under its jurisdiction or control at the latest within ten years following the entry into force of the Convention. Within that time, if a state party believes it cannot destroy or ensure the destruction of all anti-personnel mines by the end of ten years, it may submit a request for an extension to a meeting of the states parties or a review conference. The request must contain, *inter alia*, a reference to the environmental implications of the extension. Art. 5(4)(c). The meeting of the states parties or the review conference decides by majority vote whether to grant the request, taking into consideration the factors mentioned in the agreement, including the environmental implications. The Convention does not require an environmental impact assessment prior to mine clearance activities, although this may be necessary pursuant to other international agreements or national law. Each state party is required to report to the Secretary-General of the United Nations within 180 days of the entry into force of the Convention for that party on numerous matters related to mines and mined areas. Included in the reporting obligation is information regarding the status of programs for the destruction of anti-personnel mines, including details of the methods that will be used in destruction, the location of all destruction sites, and the applicable safety and environmental standards to be observed. Art. 7(1)(f).

Throughout the 1990s, various international organizations attempted to consider the impacts of armed conflict on the environment and to propose new rules. The IAEA General Conference adopted a resolution on September 21, 1990, recognizing that attacks or threats of attack on nuclear facilities devoted to peaceful purposes could jeopardize the development of nuclear energy, affirmed the importance and reliability of its safeguard procedures, and emphasized the need for the Security Council to act immediately should such a threat or attack occur. IAEA GC (XXXIV) RES/533 (Sept. 21, 1990).

The UN General Assembly supported the IAEA with its own Resolution 45/581 (Dec. 4, 1990) in which it referred to the IAEA resolution and expressed its conviction of the need to prohibit armed attacks on nuclear installations. It expressed its awareness of the danger that such an attack could result in radioactive releases with grave transboundary consequences. On November 25, 1992, the General Assembly again adopted a resolution on the protection of the environment in times of armed conflict, affirming that environmental considerations constitute one of the elements to be taken into account in implementing the principles of law applicable in armed conflict. In referring to the Iraqi occupation of Kuwait, it condemned the destruction of hundreds of oil-well heads and the release and waste of crude oil into the sea and noted that existing provisions of international law prohibit such acts. G.A. Res. 47/37, Nov. 25, 1992. It stressed that destruction of the environment, not justified by military necessity and carried out wantonly, is clearly contrary to existing international law. The Resolution invited the International Committee of the Red Cross to report on activities undertaken by the Committee and other relevant bodies with regard to the protection of the environment in times of armed conflict.

The ICRC produced two reports, the second of which included model guidelines for military manuals. "Protection of the Environment in Time of Armed Conflict," submitted by the UN Secretary-General to the 48th session of the General Assembly. UN Doc. A/48/269 (July 29, 1993). The General Assembly did not formally approve the guidelines, but invited states to disseminate them widely. Guidelines for Military Manuals and Instructions on the Protection of the Environment in Times of Armed Conflict, UN Doc. A/49/323 Annex (Aug. 19, 1994). See also G.A. Res. 49/50 (Dec. 9, 1994), para. 11 (inviting states to disseminate the guidelines).

In 1994, UNEP established a Working Group on Liability and Compensation or Environmental Damage Arising From Military Activities as part of its Montevideo Program for the Development and Periodic Review of Environmental Law (II-1993). According to the Report, a state that has committed an act of aggression cannot rely on the rules of international law allowing for exclusions or exemptions of responsibility and liability, but will be fully liable for damage to the environment. The Working Group also proposed a comprehensive definition of environmental damage and methods of valuation. UNEP/ENV.LAW/3/info.1, Oct. 15, 1996, 27 EPL 134 (1997).

2. Claims for Environmental Damages in Armed Conflict

The Gulf War raised numerous questions about the law applicable to environmental protection during armed conflicts. In January 1991, the Iraqi military occupying Kuwait detonated more than 700 Kuwaiti oil wells, igniting more than 600 of them. Smoke from the fires affected not only Kuwait,

but Iran, Turkey, Jordan, and Saudi Arabia, while oil that spilled into the desert seeped into the underground aquifer. Iraq also opened valves at several oil terminals and pumped large quantities of crude oil into the Gulf, perhaps as much as 11 million barrels. Subsequent allied bombing of the terminals halted the flow of oil. Other oil slicks appeared, apparently caused by damage to tankers and oil-storage facilities. Oil refineries, oil gathering stations, and power and water desalination plants were all damaged or destroyed. Letter of 12 July 1991 from the Chargé d'affaires of the Permanent Mission of Kuwait to the United Nations to the Secretary-General, July 15, 1991; UN Doc. A/45/1035, S/22787, at 2.

The UN Security Council reacted to the Iraqi destruction in Resolution 687, paragraph 16, which affirmed that Iraq:

is liable under international law for any direct loss, damage, including environmental damage and the depletion of natural resources, or injury to foreign Governments, nationals and corporations, as a result of Iraq's unlawful invasion and occupation of Kuwait.

Paragraph 18 of the Resolution created a fund for the payment of claims and established a commission to administer the fund. A portion of the export sales of Iraqi oil is used for the fund. This action represented the first time that an international body has been charged with compensating for wartime environmental damage.

The UN Compensation Commission (UNCC) established its procedures regarding claims in a series of decisions taken by its Governing Council. Council Decision 7 provides that payments are to be made available with respect to direct environmental damage and the depletion of natural resources, including losses or expenses resulting from:

- (a) Abatement and prevention of environmental damage, including expenses directly relating to fighting oil fires and stemming the flow of oil in coastal and international waters;
- (b) Reasonable measures already taken to clean and restore the environment or future measures which can be documented as reasonably necessary for that purpose;
- (c) Reasonable monitoring and assessment of environmental damage for the purpose of evaluating and abating harm and restoring the environment;
- (d) Reasonable monitoring of public health and performing medical screening for the purposes of investigation and combating increased health risks as a result of the environmental damage; and
- (e) Depletion of or damage to natural resources.

UNCC, Governing Council Decision 7, para. 35, revised Mar. 16, 1992, S/AC.26/1991/7/Rev.1. The list is not exhaustive.

Following completion of earlier categories of cases, such as those concerned with individual personal injuries, the UNCC turned to the question of environmental claims. In 1996, the UNCC approved a payout of U.S. \$610,048,547 to the Kuwait Oil Company on behalf of the public oil sector as a whole for the well blowout. See *Decision Concerning the Well Blowout Control Claim*, Governing Council of the UNCC, 66th meeting, Dec. 17, 1996, S/AC.26/Dec. 40 (1996), Dec. 18, 1996.

In December 1998, the Governing Council of the UNCC appointed a three-member panel to review other claims for losses resulting from environmental damage and the depletion of natural resources submitted by governments and by public sector enterprises. Before the panel began consideration of the environmental claims, the Governing Council decided to “consider the special circumstances pertaining to successful environmental monitoring and assessment claims and, in this context, to consider addressing the level and priority of payments to be made in respect of such claims.” Dec. 73, S/AC.26/Dec. 73 (1999), June 25, 1999. Two years after establishing a template for claims, the UNCC decided to provide technical assistance to Iraq in defending the environmental claims. S/AC.26/Dec. 124 (2001), June 22, 2001. The Governing Council, observing the complexity and limited amount of international practice relevant to environmental losses, noted that this category of claims, unlike the others, would be conducted through written and oral proceedings. As a result, pursuant to the decision, Iraq was permitted to select experts to assist in developing the facts and technical issues, with the UNCC compensating the experts.

On June 22, 2001, the UNCC delivered its first set of awards on 107 claims for monitoring and assessment of environmental damage, depletion of natural resources, monitoring of public health, and performing medical screenings for the purposes of investigation and combating increased health risks (the “monitoring and assessment claims”). The total amount of the claims exceeded U.S. \$1 billion (\$1,007,412,574), with Kuwait and Saudi Arabia each claiming close to \$500 million. See UNCC, *Report and Recommendations Made by the Panel of Commissioners Concerning the First Instalment of “F4” Claims*, UN Doc. S/AC.26/2001/16, June 22, 2001.

The environmental claims reported in the first installment concerned monitoring and assessment related to damage from air pollution; depletion of water resources and damage to groundwater; damage to “cultural heritage resources;” oil pollution to the Persian Gulf; damage to coastlines; damage to fisheries; damage to wetlands and rangelands; damage to forestry, agriculture, and livestock; and damage or risk of damage to public health. In addition to the claims that were expected to be filed related to oil fires and released oil from destroyed wells, claims were filed over disruption of desert and coastal ecosystems due to the movement of military vehicles, personnel, and ordnance, as well as adverse impacts on the environment resulting from the transit and settlement of persons who departed Iraq and Kuwait as a result of the invasion.

The claims for monitoring and assessment presented special problems, because they were heard before any substantive claims were considered. The panel accepted that the claims for monitoring and assessment should be determined first, however, because the results of the monitoring and assessment could be critical in enabling claimants to establish the existence of damage and evaluate the quantum of compensation to be claimed. The claims for monitoring and assessment were thus permitted in order to generate evidence of substantive harm. At the same time, the panel sought a “nexus between the activity and environmental damage or risk of damage that may be attributed directly to Iraq’s invasion and occupation of Kuwait.” Para. 31.

In assessing the nexus and reasonableness of the monitoring and assessment activity, the panel considered:

- the possibility of causality, i.e., the plausibility that pollutants released during the invasion and occupation could have impacted the territories of the claimants;
- whether the areas or resources in question could have been affected by pollutants resulting from the conflict;
- whether there is evidence of environmental damage or risk of damage; and
- whether the monitoring and assessment might produce results that could assist the panel in determining substantive claims.

According to the panel, the mere fact that monitoring and assessment activity does not establish conclusively that environmental damage has been caused does not necessarily supply a valid reason for rejecting a claim for expenses of the monitoring activity, because it could be of benefit even if no evidence of war-caused damage is found. The same is true if the results show that damage has occurred, but no restoration or remediation is possible or feasible.

To be within the UNCC mandate, any proven damage has to be attributable to Iraq’s invasion and occupation. As in other liability proceedings, separating out the causation has been a difficult matter, particularly in the absence of baseline information. Monitoring and assessment to determine causality would be compensable, even if the results ultimately demonstrate the cause was other than Iraq.

In assessing each claim, the panel considered the circumstances of the claim, including the nature of the damage to be assessed and the location and purpose of the monitoring and assessment activity and the appropriateness of the activity by reference to generally accepted scientific criteria and methodologies. Where supporting evidence and documentation was lacking, the panel rejected claims. The successful claimant states must submit periodic progress reports on environmental monitoring and assessment.

The panel reported a second installment of environmental claims in late 2002, including 19 claims from states outside the region (Australia, Canada, Germany, the Netherlands, United Kingdom, and United States). *Concerning the Second Installment of "F4" Claims*, UN Doc. S/AC.26/2002/26, Oct. 3, 2002. The 30 claims totaled some U.S. \$872,760,534 for expenses incurred for measures to abate and prevent environmental damage, to clean and restore the environment, to monitor and assess environmental damage, and to monitor public health risks alleged to have resulted from Iraq's invasion and occupation of Kuwait.

The second-installment claims involved some novel issues and by Procedural Order Nos. 7 and 8, both dated February 1, 2002, the panel informed Iraq and the regional claimants that oral proceedings would be held to focus on, *inter alia*, whether the phrase "environmental damage and the depletion of natural resources" under Security Council Resolution 687 (1991) and Governing Council Decision 7 includes loss or damage to elements, such as cultural property, human health, aesthetic values of landscapes, etc. After oral and written proceedings, the panel gave an expansive reading to Governing Council Decision 7 on the meaning of environmental damage. In the view of the panel, the term "environmental damage," in paragraph 16 of Security Council Resolution 687 (1991), could cover, for example, expenses incurred due to measures undertaken to prevent or abate harmful impacts of airborne contaminants on property or human health, provided that the losses or expenses are a direct result of Iraq's invasion and occupation of Kuwait.

Regarding the prevention and abatement claims of states from outside the region, the panel found that neither Security Council Resolution 687 nor Governing Council Decision 7 restricted eligibility for compensation to losses or expenses incurred by the countries in which the environmental damage occurred or by countries located in the Persian Gulf region. In the view of the panel, expenses resulting from assistance rendered to countries in the Persian Gulf region to respond to environmental damage, or threat of damage to the environment or public health, qualified for compensation.

The conflicts that marked the breakup of the former Yugoslavia also involved environmental damage, and the precedent of the Gulf War stimulated international organizations and civil society to monitor and document the damage. See, e.g., Regional Environmental Center for Central and Eastern Europe, *Assessment of the Environmental Impact of Military Activities during the Yugoslavia Conflict: Preliminary Findings* (June 1999). The 1999 Kosovo conflict allegedly included poisoning of wells, scorched earth tactics, and indiscriminate bombing, leading UNEP to establish an expert task force that included NGO representatives to assess the environmental damage.

Other consequences followed the air campaign conducted by members of the North Atlantic Treaty Organization (NATO) against Yugoslavia dur-

ing the Kosovo conflict. Allegations that the environmental and other impacts of the bombing made the attacks illegal under international humanitarian law persuaded the prosecutor for the International Tribunal for the Former Yugoslavia to appoint a committee to advise on whether or not to conduct a formal investigation. The June 14, 2000, Final Report of the Committee Established to Review the NATO Bombing Campaign against the Federal Republic of Yugoslavia recommended against an investigation. In so doing, the Committee assessed both the law and the available evidence that were relevant to its mandate. Final Report of the Committee Established to Review the NATO Bombing Campaign against the Federal Republic of Yugoslavia, *available at* <http://www.un.org/icty/pressreal/nato/061300.htm>.

On the first matter, the Committee considered Additional Protocol I's Arts. 35(3) and 55 to state the "basic" legal provisions applicable to environmental protection during armed conflict. Significantly, the Committee asserted that Art. 55 "may . . . reflect current customary law" (para. 16), despite a suggestion from the International Court of Justice four years earlier that it does not. See *Advisory Opinion on the Threat or Use of Nuclear Weapons*, 1996 ICJ 242, para. 31.

Turning to the facts, the Committee found that the bombing campaign did cause some environmental damage through attacks on industrial facilities, such as chemical plants and oil installations that released pollutants. Final Report, para. 14. But, given the duty to find cumulative conditions fulfilled (long-term, widespread, and severe damage) and acknowledging the high threshold set by those conditions, the Committee concluded that it would be difficult to assess whether such a threshold was reached in this case "even if reliable environmental assessments were to give rise to legitimate concern concerning the impact of the NATO bombing campaign." *Id.*, para. 15. The Committee concluded by expressing its opinion that, according to the information in its possession, "the environmental damage caused during the NATO bombing campaign does not reach the Additional Protocol I threshold." *Id.*, para. 17.

The conclusion did not end the matter, because the Committee estimated that the legality of the attacks also had to be tested in light of the principles of military necessity and proportionality. It would appear that there was little debate over the issue of military necessity, because most of the discussion in the Report concerns proportionality. The Committee states that in applying this principle "it is necessary to assess the importance of the target in relation to the incidental damage expected: if the target is sufficiently important, a greater degree of risk to the environment may be justified." *Id.* Regretting the lack of concrete guidelines on what constitutes excessive damage, the Committee said that "at a minimum, actions resulting in massive environmental destruction, especially when they do not serve a clear and important military purpose, would be questionable." *Id.*, para. 22. While recommending that no investigation pro-

ceed, the Committee considered that, independent of the principle of proportionality, there is a duty to take precautionary measures to minimize collateral damage to the environment. “If there is a choice of weapons or methods of attack available, a commander should select those which are most likely to avoid, or at least minimize incidental damage. In doing so, however, he is entitled to take account of factors such as stocks of different weapons and likely future demands, the timeliness of attack and risks to his own forces.” *Id.*, para. 21. Thus, the general principles of international humanitarian law play as great a role as do the more recent provisions that specifically mention environmental protection.

3. Advisory Opinions and Judgments of the International Court of Justice

In 1995, the UN General Assembly requested an advisory opinion on the question of whether the threat or use of nuclear weapons is a violation of international law, in light of their impacts on health and the environment. *Request for an Advisory Opinion from the International Court of Justice on the Legality of the Threat or Use of Nuclear Weapons*, G.A. Res. 49/75K UNGAOR, 49th Sess., Supp. No. 49, at 71, UN Doc. A/4949 (1995). In fact, transnational civil society, in the form of a coalition of non-governmental organizations and individuals calling themselves “the World Court Project,” was behind the request, having successfully exerted pressure on the General Assembly to make the request to the Court. The Court decided it had jurisdiction to answer the General Assembly’s questions and did so on July 8, 1996. Also before the Court, in a separate proceeding, was an effort to reopen a contentious case filed by Australia and New Zealand against France, challenging the legality of nuclear testing in the South Pacific. The Court held that the proceedings were definitively terminated, but noted that its conclusion was “without prejudice to the obligations of states to respect and protect the natural environment.” See *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court’s Judgment of Dec. 20, 1974 in the Nuclear Tests (New Zealand v. France) Case*, Order of Sept. 22, 1995, 1995 ICJ para. 64.

In the advisory opinion on the legality of nuclear weapons, the Court was intensely divided on some issues and unanimous in regard to others. Given the complexity of the matter, it is perhaps not surprising that, for the first time in its history, each judge issued a separate declaration or opinion. Several holdings were closely linked to international environmental law. First, the Court found by a vote of 11–3 that neither customary nor conventional international law—including international environmental law—prohibits the existence of nuclear weapons *as such*. *Legality of the Threat of Use of Nuclear Weapons*, at 36, para. 105(2)(B). The three dissenting judges found that nuclear weapons, in all their probable uses, are so devastating that they would be likely to breach human rights and envi-

ronmental standards and thus are prohibited as such. The Court unanimously agreed that “[a] threat or use of nuclear weapons should . . . be compatible with . . . the principles and rules of international humanitarian law, as well as with specific obligations under treaties and other undertakings which expressly deal with nuclear weapons.” *Id.* at 36, para. 105(2)(D).

The Court’s final determination was the most divided. The Court’s vote was 7–7, necessitating a deciding vote of the President holding that “the threat or use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict and, in particular, the principles and rules of humanitarian law.” *Id.*, para. 105(2)(E). The Court went on, however, to say that it could not conclude definitively whether or not extreme self-defense, in which the life of the state would be at stake, would allow the threat or use of nuclear weapons.

The Court recognized that “the use of nuclear weapons could constitute a catastrophe for the environment,” the latter representing “not an abstraction but . . . the living space, the quality of life and the very health of human beings, including generations unborn.” Given this, the Court held that states must take environmental considerations into account in assessing what is necessary and proportionate in the pursuit of military objectives. The Court noted that the provisions of Additional Protocol I to the 1949 Geneva Conventions embody a general obligation to protect the natural environment against widespread, long-term and severe environmental damage; the prohibition of methods and means of warfare that are intended, or may be expected to cause such damage; and the prohibition of attacks against the natural environment by way of reprisals. Thus, while no specific provision prohibits the use of nuclear weapons, humanitarian law indicates that important environmental factors should be taken into account in the use of such weaponry in armed conflicts.

4. Environmental Security and Conflict Prevention

War is inimical to sustainable development and can lay the seeds for future violence. The aftermath of war can place additional pressures on natural resources as governments struggle for reconstruction and can be as harmful to the environment as war itself. If it is now generally recognized that war causes environmental harm, it is also increasingly accepted that environmental degradation has the potential to produce internal and interstate conflict by undermining stability and producing mass migrations. Given the integrated nature of the environment, it is impossible for a state to protect itself entirely against intentional or accidental environmental harm originating in another state. The consequences of that harm may be severe and long-lasting to the receiving state.

An additional concern is the problem of “environmental refugees,” many fleeing water scarcity and soil that is no longer fertile. Their num-

bers are increasing to the point where they may outnumber refugees displaced by wars and persecution. The number of refugees may double by the year 2010, if soil and water degradation continues at current rates. If predictions of rising sea levels due to global climate change are accurate, a staggering number of refugees from low-lying areas could join them. The rapid movement of refugees and the sudden increase in local demand for food, fuelwood, and goods for barter can lead to significant degradation of ecosystems and natural spaces.

Given these concerns, traditional visions of state security are expanding to include environmental security. National security law and policy have traditionally focused on protecting the territorial integrity and political sovereignty of the state from military aggression from other states, but now place increasing emphasis on the growing array of non-military and non-conventional threats, including economic change, terrorism, population growth, and migration. Key environmental threats that have received scrutiny include: resource scarcity, outbreaks of infectious disease, toxic contamination, ozone depletion, global warming, water pollution, soil degradation, and loss of biodiversity.

Both “environment” and “security” are abstract concepts whose meaning has been extensively debated. In its *1994 UN Human Development Report* (UNDP, 1994), the UNDP described security as an “integrative” rather than merely a “defensive” concept. The UNDP definition of human security includes seven categories of threats, ranging from economic and food security to protection of human rights and access to clean water, air, and land.

In addition to recognizing that environmental harm can be a threat to state security, an emerging consensus accepts that the object of security policy can no longer be confined to the state, but must range to governance levels above (e.g., regional and international) and below (e.g., subregions and individuals) the state. The 1986 nuclear meltdown at Chernobyl and its attendant devastation of neighboring human populations and ecosystems, and the global recognition of the common threat to humanity posed by the declining ozone layer, placed individual health and international environmental governance within the domain of security institutions.

There is also growing agreement that environmental degradation, inequitable access to resources, and predation of valuable plants, animals, and minerals are among the most important sources of human insecurity. They can, in many instances, trigger or fuel violence and increase vulnerability to natural disasters. More sustainable and equitable management of the environment can be a cost-effective means for building social cohesion and reinforce mechanisms for collaboration across social and political boundaries. In sum, environmental protection has become an essential part of conflict prevention.

There are few legal instruments addressing this issue. None of the refugee treaties, for example, defines refugee to include those fleeing envi-

ronmental harm or devastation. Such individuals do not, therefore, qualify for asylum within the territory of another state. Despite the absence of legal measures, the issue of environmental security has emerged in national policies and international discussions. In 1996, the United States created a high level position to focus on international environmental issues that bear on national security.

As an example of conflict prevention, the governments of Colombia and Panama suggested that establishing a series of nature parks along their common border could reduce tension there. Earlier, the United States and Mexico established Chamizal National Memorial in 1963 as a key part of the agreement that resolved a 100-year-old border dispute along the Rio Grande. Another combined environmental/security action can be seen in the Arctic Military Environmental Cooperation (AMEC) Program, a forum for dialogue and joint activities among U.S., Russian, and Norwegian military and environmental officials to ensure that the militaries of the respective nations help assess, preserve, and repair the Arctic environment. The program addresses Arctic environmental issues that are related to the militaries' capabilities and unique activities. Currently, six projects fall under the AMEC, including four radioactive waste projects and projects dealing with military base cleanup and the treatment of shipboard wastes.

UNEP began an initiative for South-Eastern European and Central Asian states for presentation to the Kiev Summit in May 2003. As UNEP reports, "Regional inequalities figure prominently in local tensions—per capita GDP in Western Europe is ten times that of the rest of Europe, whereas GDP in many countries of Eastern Europe and Central Asia fell (for some by as much as 40%) after 1990 as a consequence of the economic collapse of the East Bloc. Internal economic fragility place great pressure on newly-democratic transition states. Ensuring economic development and responding to governance challenges in the context of deepening regional integration will intensify pressure on natural resources unless mechanisms are put in place in advance to manage the transition." UNEP began an initiative for South-Eastern European and Central Asian states for presentation to the Kiev Summit in May 2003.¹ Background and subsequent reports² have mapped out the environmental concerns with likely security impli-

¹ The Environment and Security Initiative was launched in 2002, prior to the Kiev Summit, by UNEP, UNDP, and OSCE to raise awareness of the connections between environment and security and assess environmental risks and their impacts on security. See *Environment and Security: Transforming Risks in to Cooperation* (OSCE/UNEP/UNDP, 2003).

² See, e.g., *Environment and Security: A Framework for Cooperation in Europe* (OSCE/UNEP/UNDP, 2002); *Environment and Security Initiative: Addressing Environmental Risks and Promoting Peace and Stability: The Post Kiev Process* (OSCE/UNEP/UNDP, 2003); *Environment and Security Initiative: 2004 Progress Report* (OSCE/UNEP/UNDP, 2004).

cations and outlined the environmental policy tools best suited for promoting peace in the regions. The partner organizations have developed activities to identify environmental security priorities and promote appropriate remedies and implementation strategies.

According to UNEP, principal environmental issues with implications for regional security include:

1. Environmentally induced migration as a consequence of natural resources degradation and exclusion from resources or transboundary air pollution.
2. Increasing water scarcity. Poor water quality as a consequence of pollution and lack of infrastructure is among the major causes of infant mortality in the two regions. Many of the major cities are dependent on and are overexploiting their groundwater resources. Water pollution and scarcity may worsen in the near term as a consequence of economic recovery.
3. Aging and obsolete hydropower and nuclear energy generation facilities, chemical production facilities and infrastructure.
4. Land contamination, soil erosion and flawed irrigation schemes creating food insecurity. Of Europe's total land area, 12 percent is affected by water erosion and 4 percent by wind erosion, generally as a consequence of unsustainable agriculture, salinization and water logging.
5. Severe overharvesting of forest resources in Armenia, Georgia, and Central Asia, triggering avalanches and diminishing water quality.
6. Overfishing of transboundary marine and coastal areas, including the North Sea, Baltic Sea, Mediterranean, Black Sea, and Azov Sea. The Caspian Sea, for example, possesses 85 percent of the world's sturgeon and 90 percent of its black caviar. Shared between five states, it is increasingly threatened by extensive hydromodifications, growing oil exploration, and overfishing (including illegal traffic in caviar).
7. Coupling of environmental and ethnic grievances to fuel political insurgencies.

In sum, environmental degradation and scarcities of resources threaten to undermine the way of life of populations around the world and the stability of internal governance structures. Environmental security calls for action to prevent the degradation and scarcity from leading to internal and international conflict. The concept also implies and requires the maintenance or re-establishment of ecological balance, because an emphasis on conflict prevention alone is not effective to secure long-term security. Emphasis on protecting the environment attacks some of the root causes of conflict and at the same time highlights the common concern of humanity in this issue.

Conclusions

International law may be considered as an old tree that, despite its age, developed new branches. One of them is international environmental law, which in this regard can be compared to the law of the sea or, even more, the international law of human rights. All these new branches have their proper characteristics, but they also have features that are proper to general international law. They cannot be understood without considering that they are components of a legal system elaborated by sovereign states, which formulated their rules and norms generally in the same conditions as for the rest of international regulations, without the existence of a global constitutional order.

One of the main specificities of international environmental law is that it aims to protect non-human parts of the natural world, as well as humans: plants, animals, water, atmosphere, and systems that contain several or all of these elements. It also includes the natural world as it has been altered by human activities, such as landscapes. Despite its links with the life and well being of humans, the final objective of environmental law is outside the world of humans who create the legal system and implement its norms. Stakeholders and their relations to environmental elements may have an important role to play in environmental protection, but they are not the direct object of such protection.

Still, the role of stakeholders is particularly important in environmental law. For many aspects of international law, states—which are its primary subjects—are the only actors involved: one may think of treaty law, of the creation of customary international law, of the rules governing international relations, or even that of international organizations. The concept of “stakeholders” has a double meaning in the context of environmental protection: a positive and a negative. On the one hand, it means all the actors who participate in the deterioration of the environment, either by polluting its components, by destroying certain living organisms, or by harming ecosystems. On the other hand, stakeholders are directly or indi-

rectly real or potential victims of such deterioration. Whether they are active or passive, stakeholders do not include state authorities that can act or refuse to act. This means that states, which are the main actors in the international legal relations, have to impose the respect and application of international environmental law upon their citizens. Their obligations generally go beyond implementing international environmental rules by themselves to imposing the respect of such rules on non-state actors. This may raise a series of legal problems, including the transposition of international legal rules into the domestic law systems and liability for the violation of international environmental rules. In certain situations, the implementation of environmental treaties can involve the creation by the contracting states of new authorities or procedures in their domestic order, making the application of the environmental rules more complicated and, often, also much slower.

One of the reasons for such difficulties is a fundamental change in legal approaches to problems and techniques. The objective of law is traditionally the safeguarding of present rights and interests: the respect for human rights, property, contracts, family relations, maintaining public order and security, and peace. Environmental protection also tends to maintain and protect existing situations, such as the quality of water and air, the survival of certain wild species, and the integrity of ecosystems. Its final aim is, however, to ensure that the environment of the future will allow life to continue in adequate conditions. This is the meaning of the “right of future generations,” an expression often used in international instruments related to environmental protection. This perspective, oriented towards the years and sometimes even centuries to come, is new in law, in particular in international law. It involves a very different approach by governments that have to accept and apply the principle of prevention and even the precautionary approach, which admits that decisions may be taken in the absence of scientific certainty. One could speak of a fundamental change in law: the irruption of the time perspective in legal orders traditionally aimed at the continuation and respect of present situations. The emergence of the concept of sustainable development also illustrates the temporal element: although development in itself is not a legal concept, the requirement that it should be sustainable, that is to say that it should continue, which involves the protection of the environment, contributes to reinforcing the role of the time dimension in law and in particular in international law.

As for the composition of international environmental law, in general there are two sets of norms, the legal status of which is the same, but whose practical application can be different. The oldest rules appeared at the beginning of the 20th century with the aim of protecting some species of wild animals. An important series of multilateral environmental agreements followed, with their number multiplying after the 1970s. Wildlife protection then extended to concern for the seas, freshwater, nature sites, and the atmosphere. The common characteristic of these texts is that they cre-

ate obligations for states, which demand measures of protection that should be applied under their jurisdiction of control without any reciprocity. This means that the contracting states have to fulfill such obligations toward the global human community in the common interest of present and future humankind.

The second set of norms began to appear in the 1940s with the arbitral sentence delivered in the *Trail Smelter* case. It concerns relations between states and the protection of the environment of one or several of them against acts and facts that take place under the jurisdiction or the control of another or some other states. Here, traditional international law principles can be applied, being understood that they should be adapted to problems that were not considered earlier. At the beginning, the simple fact of transfrontier harm and the damage that it may cause to the environment were covered by the application of principles of international and comparative law. Later, these principles were expanded to cover relations between individuals living on different sides of state borders who now should be informed of planned activities that could harm their environment and who should participate in the making of decisions related to such activities. They also should access to adequate remedies.

In sum, like national environmental law systems, international environmental law contributes to the recognition of the role of individuals in the life of the human community and the understanding of a global solidarity, even when local or regional interests are at stake. This trend should be constantly reinforced in the perspective of the exhaustion of natural resources in a world with a constantly growing population.

Appendix A

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Secretariat <http://www.unfccc.int>
- Commission on Sustainable
Development <http://www.un.org/dpcds/dsd/csd.htm>
- Council of Europe <http://www.coe.fr/>
- FAO <http://www.fao.org/>
- Global Environment Facility <http://www.gefweb.com/>
- IAEA <http://www.iaea.org/>
- ILO <http://www.ilo.org/>
- International Law
Commission <http://www.geneva.ch/ilc.htm>
- International Maritime
Organization <http://www.imo.org/>
- IUCN <http://www.iucn.org/>
- NAFTA Commission on
Environmental
Cooperation <http://www.cec.org/>
- OECD <http://www.oecd.org/>
- Organization of African
Unity <http://www.rapide-pana.com/demo/oau>
- Organization of American
States <http://www.oas.org/>
- Ozone Treaty Secretariat <http://www.unep.org/ozone/index.html>

278 Guide to International Environmental Law

Transboundary Freshwater Dispute Database	http://www.transboundarywaters.orst.edu
UNCLOS Secretariat	http://www.un.org/Depts/los/
UNDP	http://www.undp.org/
UNECE	http://www.unece.org
UNESCO	http://www.unesco.org/
UNEP	http://www.unep.ch/
U.S.-Canada International Joint Commission	http://www.ijc.org/
WHO	http://www.who.org/
WMO	http://www.wmo.org/
World Bank	http://www.worldbank.org/
World Trade Organization	http://www.wto.org/
World Wide Fund for Nature	http://www.wwf.org/

Appendix B

Multilateral Environmental Agreements

GENERAL AGREEMENTS

- The Antarctic Treaty (Washington, Dec. 1, 1959), 402 UNTS 71, UKTS 97 (1961), Cmd. 1535, 12 UST 794, TIAS 4780, 52 AM. J. INT'L L. 477 (1960)
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ARMED CONFLICT

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- Protocol II to the Convention on Prohibitions on the Use of Certain Conventional Weapons which may be Deemed to be Excessively Injurious or to Have Indiscriminate Effects (May 3, 1996), 35 ILM 1206
- Convention on the Prohibition of the Use, Stockpiling, Production, and Transfer of Anti-Personnel Mines and on their Destruction (Oslo, Sept. 18, 1997), 36 ILM 1507 (1997)

ATMOSPHERE AND OUTER SPACE

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- Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution Concerning the Control of Emissions of Volatile Organic Compounds or Their Transboundary Fluxes (Geneva, Nov. 18, 1991), 31 ILM 568 (1992)
- Framework Convention on Climate Change (New York, May, 9, 1992), 31 ILM 849 (1992)
- Protocol to LRTAP on Further Reduction of Sulphur Emissions (Oslo, June 14, 1994), 33 ILM 540 (1994)
- Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, Sept. 17, 1997)
- Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, Dec. 11, 1997)

- Protocol to the Convention on Long-Range Transboundary Air Pollution on Heavy Metals (Aarhus, June 24, 1998)
- Protocol to the Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants (Aarhus, June 24, 1998)
- Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-Level Ozone (Gothenburg, Nov. 30, 1999)
- Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (Beijing, Dec. 3, 1999),
- ASEAN Agreement on Transboundary Haze Pollution (Kuala Lumpur, June 10, 2002)

FRESHWATERS

- United States-Mexico Convention Concerning the Equitable Distribution of the Waters of the Rio Grande for Irrigation Purposes (May 21, 1906), UN Doc. ST/LEG/Ser. 8/12, 232; 34 Stat. 2953, TS 455, 9 Bevans 924
- Treaty between the United States and Great Britain Respecting Boundary Waters Between the United States and Canada (Washington, Jan. 11, 1909), 36 Stat. 2448, TS No. 548, 12 Bevans 319, 4 AM. J. INT'L L. 239 (1920 Supp.)
- U.S.-Mexico Treaty Relating to the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande (Feb. 3, 1944), 3 UNTS 313, 59 Stat. 1219, TS No. 994
- United States-Canada Agreement on Great Lakes Water Quality with Annexes (Nov. 22, 1978), 30 UST 1383, TIAS 9257. Amended Oct. 16, 1983, TIAS 10798
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, Mar. 17, 1992), UN Doc. E/ECE/1267, 31 ILM 1312 (1992)
- Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (Chiang Mai, Apr. 5, 1995), 34 ILM 864 (1995)
- Convention on the Law of the Non-Navigational Uses of International Watercourses (New York, May 21, 1997), 36 ILM 700 (1997)
- Convention on the Protection of the Rhine (Bern, Apr. 12, 1999)
- Protocol on Water and Health to the 1992 Helsinki Convention on the Protection and Use of Transboundary Watercourses and International Lakes (London, June 17, 1999), UNECE, MP/WAT/AC.1/1999/1

HAZARDOUS SUBSTANCES

- Vienna Convention on Early Notification of a Nuclear Accident (Sept. 26, 1986), Misc. 2 (1989), Cmd. 565, IAEA INFCIRC 335, 25 ILM 1370 (1986)

- Vienna Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Sept. 26, 1986), Misc. 3 (1989), Cmd. 566, IAEA INFRIRC 336, 25 ILM 1377 (1986)
- Agreement between Canada and the United States on Transfrontier Movements of Hazardous Waste (Ottawa, Oct. 28, 1986)
- Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel, Mar. 22, 1989), UNEP/WG.190/4, 28 ILM 657 (1989)
- Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa with Annexes (Bamako, Jan. 29, 1991), 30 ILM 773 (1991), 31 ILM 163 (1992)
- Convention on Persistent Organic Pollutants (Stockholm, May 22, 2001), 40 ILM 532 (2001).
- Convention on the Transboundary Effects of Industrial Accidents (Helsinki, Mar. 17, 1992), UN Doc. E/ECE/1268 31 ILM 1330 (1992)
- IAEA Convention on Nuclear Safety (Vienna, Sept. 29, 1994), INF-CIRC/449 of July 5, 1994, 33 ILM 1514 (1994)
- Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Sept. 7, 1997)
- Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Sept. 10, 1998), 30 ILM1 (1999)
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity (Montreal, Jan. 20, 2000), 39 ILM1027 (2000).

HUMAN RIGHTS

- European Convention for the Protection of Human Rights and Freedoms (Rome, Nov. 4, 1950), 213 UNTS 221, ETS 5, UKTS 71 (1953), Cmd. 8969, 156 BFSP 915
- UN Covenant on Civil and Political Rights, G.A. Res. 2200 (XXI) (Annex) 16 December 1966; 6 ILM 368 (1967)
- UN Covenant on Economic, Social & Cultural Rights, G.A. Res. 2200 (XXI) (Annex) Dec. 16, 1966, 6 ILM 360 (1967)
- American Convention on Human Rights (San José, Nov. 22, 1969), OASTS No. 36, 9 ILM 673 (1970)
- African Charter on Human Rights and Peoples' Rights (Jan. 19, 1981), 21 ILM 59 (1982), 7 HUM. RTS. L.J. 403 (1986)
- Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights (Protocol of San Salvador, Nov. 17, 1988), OASTS 69, 28 ILM 156 (1989)
- European Charter on the Environment and Health (WHO, Dec. 8, 1989), 20 EPL 57 (1990).

Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus, June 25, 1998)

LIABILITY

Convention on Third Party Liability in the Field of Nuclear Energy (Paris, July 29, 1960), 8 E.Y.B. 203, UKTS 69 (1968), Cmd. 3755, 55 AM. J. INT'L L. 1082 (1961)

Convention on the Liability of Operators of Nuclear Ships (Brussels, May 25, 1962), 57 AM. J. INT'L L. 268 (1963)

Convention on Civil Liability for Nuclear Damage (Vienna, May 21, 1963), Misc. 9 (1964), Cmd. 2333, 2 ILM 727 (1963), Kiss 179, 5 WESTON VJ.3

International Convention on Civil Liability for Oil Pollution Damage (Brussels, Nov. 29, 1969), 973 UNTS 3, UKTS 106 (1975), Cmd. 6183, 9 ILM 45 (1970)

Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Brussels, Dec. 18, 1971), UKTS 95 (1978), Cmd. 7383, 11 ILM 284 (1972), Kiss 255. Amended 1976, 16 ILM 621 (1977)

Convention on International Liability for Damage Caused by Space Objects (Mar. 29, 1972), 961 UNTS 187, UKTS 16 (1974), Cmd. 5551, 24 UST 2389, TIAS 7762

Protocol to the Brussels Convention on Civil Liability for Oil Pollution Damage, Nov. 19, 1976, UKTS 26 (1981), Cmd. 8238, 16 ILM 617 (1977)

Protocol to the 1971 Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Nov. 27, 1992)

Convention on Civil Liability for Damage Resulting From Activities Dangerous to the Environment (Lugano, June 21, 1993), 32 ILM 1228 (1993)

Protocol to Amend the Convention on Limitation of Liability for Maritime Claims (London, May 2, 1996)

International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (May 3, 1996)

International Convention on Civil Liability for Bunker Oil Pollution Damage (London, Mar. 23, 2001)

Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (Vienna, Sept. 12, 1997)

Convention on Supplementary Compensation for Nuclear Damage (Vienna, Sept. 12, 1997)

Convention on the Protection of the Environment through Criminal Law (Strasbourg, Nov. 4, 1998, ETS No. 172

Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal (Basel, Dec. 10, 1999)

MARINE ENVIRONMENT

International Convention for the Prevention of Pollution of the Sea by Oil (London, May 12, 1954), 327 UNTS 3, UKTS 54 (1958), Cmd. 595, ATS 7 (1962); CTS 31 (1958), 12 UST 2989, TIAS No. 4900, Kiss 101. Amended 1962: 600 UNTS 332, UKTS 59 (1967), Cmd. 3354, 17 UST 1523, TIAS No. 6109. Amended 1969: UKTS 21 (1978), Cmd. 7094, 28 UST 1205, TIAS 8508

International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Brussels, Nov. 29, 1969), UKTS 77 (1975), Cmd. 6056, 26 UST 765, TIAS 8068, 9 ILM 25 (1970)

Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo, Feb. 15, 1972), 932 UNTS 3, UKTS 119 (1975), Cmd. 6228, 11 ILM 262 (1972)

Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London, Dec. 29, 1972), 26 UST 2403, TIAS 8165. Amended Oct. 12, 1978, TIAS No. 8165, 18 ILM 510 (1979)

International Convention for the Prevention of Pollution from Ships (MARPOL) (London, Nov. 2, 1973), UN Legislative Series ST/LEG/SER.B/18, at 461, UKTS 27 (1983), Cmd. 8924, 12 ILM 1319 (1973)

Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris, June 4, 1974), UKTS 64 (1978), Cmd. 7251, 13 ILM 352 (1974)

United States-Canada Agreement Relating to the Establishment of Joint Pollution Contingency Plans for Spills of Oil and Other Noxious Substances (June 19, 1974), 25 UST 1280, TIAS 7861

International Convention for the Safety of Human Life at Sea (Nov. 1, 1974), 1184 UNTS 2 (EC Texts), UKTS 46 (1980), Cmd. 7874, TIAS 9700

Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona, Feb. 16, 1976), UN Legislative Series, ST/LEG/SER.B/19, at 459, 15 ILM 290 (1976)

Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft (Feb. 16, 1976), 15 ILM 300 (1976)

Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency Feb. 16, 1976, UN Legislative Series, ST/LEG/SER.B/19 at 468, 15 ILM 306 (1976)

Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration for and Exploitation of Seabed Mineral Resources (London, Dec. 17, 1976), 16 ILM 1450 (1977)

- Protocol Relating to the Convention for the Prevention of Pollution from Ships (MARPOL), (Feb. 17, 1978), 17 ILM 546 (1978)
- Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution (Apr. 24, 1978), 1140 UNTS 133, 17 ILM 511 (1978)
- Protocol Concerning Regional Cooperation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency (Kuwait, Apr. 24, 1978), 17 ILM 526 (1978)
- Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (Athens, May 17, 1980), 19 ILM 869 (1980), 5 WESTON V.F.21; EMuT 976:13/1
- Convention on the Conservation of Antarctic Marine Living Resources (Canberra, May 20, 1980), UKTS 48 (1982), Cmd. 8714, TIAS 10240; ATS 3 (1982), 19 ILM 837 (1980)
- Convention and Protocol for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (Abidjan, Mar. 23, 1981), UN Doc. UNEP/IG, 22/7, 20 ILM 746 (1981)
- Protocol Concerning Cooperation in Combating Pollution in Cases of Emergency (Abidjan, Mar. 23, 1981)
- Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific (Lima, Nov. 12, 1981), UN Doc. UNEP-CPPS/IG. 32/4
- Agreement on Regional Cooperation in Combating Pollution of the South-East Pacific by Hydrocarbons or Other Harmful Substances in Cases of Emergency (Lima, Nov. 12, 1981)
- Regional Convention for the Conservation of the Red Sea and of the Gulf of Aden Environment (Jeddah, Feb. 14, 1982), 9 EPL 56 (1982)
- Protocol Concerning Regional Cooperation in Combating Pollution by Oil and Other Harmful Substances in Cases of Emergency (Jeddah, Feb. 14, 1982)
- Protocol Concerning Mediterranean Specially Protected Areas (Geneva, Apr. 3, 1982)
- UN Convention on the Law of the Sea (Montego Bay, Dec. 10, 1982), UN Doc. A/Conf 62/122 (1982), Misc. 11 (1983), Cmd. 8941, 21 ILM 1261 (1982)
- Convention for the Protection and Development of the Marine Environment of the Wider Region (Cartagena de Indias, Mar. 24, 1983), UKTS 38 (1988), Cmd. 391, 22 ILM 227 (1983)
- Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region (Cartagena de Indias, Mar. 24, 1983), 22 ILM 240 (1983)
- Protocol for the Protection of South-East Pacific Against Pollution from Land-Based Sources (Quito, July 22, 1983)

- Supplementary Protocol to the Agreement on Regional Co-operation in Combating Pollution of the South-Pacific by Hydrocarbons or Other Harmful Substances (Quito, July 22, 1983)
- Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances (Sept. 13, 1983), Misc. 26 (1983), Cmd. 9104
- Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi, June 21, 1985)
- Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region (Nairobi, June 21, 1985)
- Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (Nouméa, Nov. 25, 1986), 26 ILM 38 (1987)
- Protocol for the Prevention of Pollution of the South Pacific Region by Dumping (Nouméa, Nov. 25, 1986)
- Protocol Concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region (Nouméa, Nov. 25, 1986), 26 ILM 58 (1987)
- Protocol Concerning Marine Pollution Resulting from Exploration and Exploitation of the Continental Shelf (Kuwait, Mar. 29, 1989)
- Protocol for the Protection of the South-East Pacific against Radioactive Pollution (Paipa, Sept. 21, 1989)
- Protocol for the Conservation and Management of Protected Marine and Coastal Areas of the South-East Pacific (Paipa, Sept. 21, 1989),
- Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Wellington, Nov. 24, 1989), 29 ILM1449 (1990)
- Protocol Concerning Specially Protected Areas and Wildlife to the 1983 Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Kingston, Jan. 18, 1990)
- Protocol for the Protection of the Marine Environment against Pollution From Land-Based Sources (Kuwait, Feb. 21, 1990)
- Accord of Cooperation for the Protection of the Coast and Waters of the Northeast Atlantic Against Pollution Due to Hydrocarbons or Other Harmful Substances (Lisbon, Oct. 17, 1990) 30 ILM 1227 (1991).
- Protocols I and II to the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Nouméa, Oct. 20, 1990), 29 ILM 1449 (1990).
- International Convention on Oil Pollution Preparedness, Response and Cooperation (London, Oct. 30, 1990), 30 ILM 733 (1991)
- Convention on the Protection of the Marine Environment of the Baltic Sea (Helsinki, Apr. 9, 1992)
- Convention on the Protection of the Black Sea against Pollution (Bucharest, Apr. 21, 1992), 32 ILM 1101 (1993)

- Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, Sept. 22, 1992), 32 ILM 1069 (1993)
- Protocol to Protect the Mediterranean Sea against Pollution resulting from the Exploration and Exploitation of the Continental Shelf, the Seabed and its Subsoil (Madrid, Oct. 19, 1994)
- Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, June 10, 1995)
- Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Aug. 4, 1995), 34 ILM 1542 (1995)
- Amendments to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (Syracuse, Mar. 7, 1996) I.
- Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and Their Disposal (Izmir, Oct. 1, 1996), UNEP(OCA) ED/IG.4/4.11
- Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Nov. 7, 1996)
- International Convention on Arrest of Ships (Geneva, Mar. 12, 1999)
- Protocol Concerning Pollution from Land-Based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Oranjestad, Aruba, Oct. 6, 1999)
- International Convention on the Control of Harmful Anti-Fouling Systems (London, Oct. 5, 2001)

NATURE PROTECTION

- Convention for the Protection of Birds Useful to Agriculture (Paris, Mar. 19, 1902), 30 Martens (2d) 686, 102 BFSP 969
- Treaty for the Preservation and Protection of the Fur Seals (Washington, Feb. 7, 1911), 104 BFSP 175
- Convention on Nature Protection and Wild-Life Preservation in the Western Hemisphere (Washington, Oct. 12, 1940), 161 UNTS 193, 56 Stat. 1354, TS No. 981, 3 Bevans 630
- International Convention for the Regulation of Whaling (Washington, Dec. 2, 1946), 161 UNTS 72, UKTS 5 (1949), Cmd. 7604, 62 Stat. 1716, TIAS No. 1849, 4 Bevans 248
- African Convention on the Conservation of Nature and Natural Resources (Algiers, Sept. 15, 1968), 1001 UNTS 3, EMuT 968:68
- Convention on Wetlands of International Importance (Ramsar, Feb. 2, 1971), 996 UNTS 245, UKTS 34 (1976), Cmd. 6465, 11 ILM 969 (1972)
- Convention for the Conservation of Antarctic Seals (London, June 1, 1972), 29 UST 441, TIAS 8826, 11 ILM 251 (1972)

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, Mar. 3, 1973), 993 UNTS 243, UKTS 101 (1976), Cmd. 6647, 12 ILM 1085 (1973)
- Agreement on the Conservation of Polar Bears (Oslo, Nov. 15, 1973), 27 UST 3918, TIAS 8409, 13 ILM 13 (1974)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn, June 23, 1979), 19 ILM 15 (1980), Kiss 500
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern, Sept. 19, 1979), ETS 104; UKTS 56 (1982), Cmd. 8738
- ASEAN Agreement on the Conservation of Nature and Natural Resources (Kuala Lumpur, July 9, 1985), 15 EPL 64 (1985)
- African Convention on the Conservation of Nature and Natural Resources (Maputo, July 21, 2003)
- Convention on Biological Diversity (Rio de Janeiro, June 5, 1992), 31 ILM 818 (1992)
- Convention for the Conservation of Biodiversity and the Protection of Wilderness Areas in Central America (Managua, June 5, 1992)
- Convention for the Conservation of Southern Bluefin Tuna (Canberra, May 10, 1993)
- Convention on the Management and Conservation of Natural Forest Ecosystems and Forest Plantation Development (Guatemala, Oct. 29, 1993)
- Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Nov. 29, 1993)
- Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora (Sept. 8, 1994)
- Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (Nov. 24, 1996)
- Inter-American Convention for the Protection and Conservation of Sea Turtles (Caracas, Dec. 1, 1996)

TRADE

- General Agreement on Tariffs and Trade (Oct. 30, 1947), 55 UNTS 187, ATS 23 (1948), 1947 Can. TS 27, TIAS 1700
- Fourth ACP-EEC Convention (Lome IV, Dec. 15, 1989), 29 ILM 783 (1990)
- Treaty of Asuncion, South American Quadripartite Common Market, (Argentina, Brazil, Paraguay and Uruguay, Mar. 26, 1991), 30 ILM 1041 (1991)
- Treaty Establishing the African Economic Community (Abuja, June 3, 1991), 30 ILM 1241 (1991)
- North American Free Trade Agreement (Washington, Dec. 8 and 17, 1992), Ottawa, Dec. 11 and 17, 1992, Mexico City, Dec. 14 and 17, 1992), 32 ILM 289, 32 ILM 605 (1993)

290 Guide to International Environmental Law

North American Agreement on Environmental Cooperation (Sept. 13, 1993)

Treaty Establishing the Common Market for Eastern and Southern Africa (Kampala, Nov. 5, 1993), 33 ILM 1067 (1994)

GATT, Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations (Marrakesh, Apr. 14, 1994), 33 ILM 1125 (1994)

Appendix C

Glossary

Abatement: Reducing the degree or intensity of or eliminating pollution

Accession (to a treaty): The act whereby a state accepts the offer or the opportunity to become a party to a treaty already negotiated and signed by other states. The conditions under which accession may occur and the procedure involved depend on the provisions of the treaty.

Adoption (of a treaty): The formal act by which the form and content of a proposed treaty text are established. As a general rule, the adoption of the text of a treaty takes place through the expression of the consent of the states participating in the treaty-making process. Treaties that are negotiated within an international organization will usually be adopted by a resolution of a representative organ of the organization whose membership more or less corresponds to the potential participation in the treaty in question. A treaty can also be adopted by an international conference that has specifically been convened for setting up the treaty, by a vote of two-thirds of the states present and voting, unless, by the same majority, they have decided to apply a different rule.

Advisory opinion: A non-binding opinion on any legal question given by the International Court of Justice at the request of the UN General Assembly or other authorized organs and agencies of the United Nations. In the exercise of its advisory functions, the Court is guided by rules applicable in contentious cases.

Agreement: The term “international agreement” embraces the widest range of international instruments, referring both to binding treaties and to political commitments, both oral and in writing. More narrowly, there has been a general tendency to apply the term “agreement” to bilateral or restricted multilateral treaties. It is employed especially for instruments of a technical or administrative character, which are signed by the representatives of government departments but are not subject to ratification.

Air pollutant: Any substance in air that could, in high enough concentrations, harm man, other animals, vegetation, or material. Pollutants can include almost any natural or artificial composition of matter being air-borne. They may be in the form of solid particles, liquid droplets, gases, or in combination of these forms.

Air pollution: The presence of contaminants or pollutant substances in the air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects.

Air quality standards: The level of pollutants prescribed by regulations that may not be exceeded during a specified time in a defined area.

Amendment: A subsequent change or modification of the terms of a legal instrument, such as a treaty.

Anadromous: Fish that spend their adult life in the sea but swim upriver to freshwater spawning grounds to reproduce.

Aquifer: An underground geological formation, or group of formations, containing usable amounts of ground water that can supply wells and springs.

Arbitration: A process for the resolution of disputes. Binding decisions are rendered by an impartial arbitrator or panel selected by the parties.

Atmosphere: The mass of air surrounding the earth, composed largely of oxygen and nitrogen.

Biodegradable: The ability to break down or decompose rapidly under natural conditions.

Biomass: All of the living material in a given area—often refers to vegetation. Also called “biota.”

Biosphere: The earth and its atmosphere.

Biotechnology: Techniques that use living organisms or part of organisms to produce a variety of substances that can be used to improve plants or animals, for medicine or for industry.

Brackish water: A mixture of fresh and salt water.

Bubble: A system under which existing pollution sources can propose alternate means to comply with a set of pollution controls; under the bubble concept, sources can control more than required at one emission point where control costs are relatively low in return for a comparable relaxation of controls at a second emission point where costs are higher.

Carcinogen: Any substance that can cause or contribute to the production of cancer.

Carrying capacity: In recreation management, the amount of use a recreation area can sustain without deterioration of its quality. In wildlife management, the maximum number of animals an area can support during a given period of the year.

Catanadromous: Fish that swim downstream to spawn.

CFC—chlorofluorocarbon: A family of inert non-toxic and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere, they drift into the upper atmosphere where their chlorine components destroy ozone.

CFC 12: A chlorofluorocarbon with a trademark name of Freon, commonly used in refrigeration and automobile air conditioning.

Chlorinated hydrocarbons: A class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain (DDT, aldrin, dieldrin, heptachlor, lindane, endrin etc.).

Civil liability: Owing direct responsibility to injured parties, in contrast to society as a whole (criminal responsibility), redressed through payment of money or other measures of redress.

Civil society: Pertaining to the members of a political community, from *civitas* (citizen).

Civil suit: An adversary judicial proceeding to obtain a declaration, protect a right, obtain redress, or prevent a wrong. Every lawsuit other than a criminal one.

Cloning: In biotechnology, obtaining a group of genetically identical cells from a single cell.

CO—carbon monoxide: A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion. It is toxic because of its tendency to reduce the oxygen-carrying capacity of the blood.

Coastal zone: Lands and water adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea.

Codification: The transformation of customary international law rules into treaty obligations.

Common law system: As distinguished from Roman law, civil law, canon law, and other legal systems, common law is a body of law and legal theory that was originated, developed, and evolved through the long-standing usages and customs of society, usually unwritten until announced by judgments and decrees of courts recognizing, affirming, and enforcing such usages.

Compensation: Indemnification; payment of damages or an equivalent to restore an injured party to his or her former position.

Compliance: The application by a state party of the provisions of an international treaty

Conference of the Parties (COP): An institution composed by the contracting states to a treaty. COPs convene usually on an annual or biannual basis. COPs oversee the implementation of the convention or protocol and approve its budget and financial regulations. The COP can also provide guidance, receive reports, and make recommendations to the parties. Some are serviced by permanent secretariats.

Conservation: Avoiding waste of, and renewing when possible, human and natural resources.

Contracting party: A state that has consented to be bound by the treaty, whether or not the treaty has entered into force.

Convention: Synonym for “treaty,” bilateral or multilateral. Conventions are normally open for participation by the international community as a whole, or by a large number of states. Usually the instruments negotiated under the auspices of an international organization are entitled conventions (e.g., Convention on Biological Diversity of 1992, UN Convention on the Law of the Sea of 1982, Vienna Convention on the Law of Treaties of 1969).

Cover: Vegetation or other material providing protection as a land cover.

CO₂—carbon dioxide: A colorless, odorless, non-poisonous gas that results from fossil fuel combustion and is normally a part of the ambient air. CO₂ is one of the major components of the greenhouse gases that cause global warming.

Customary law: Binding international legal rules emerging from the practice and opinion of states over time.

DDT: The first chlorinated hydrocarbon insecticide. It has a half-life of 15 years and can collect in fatty tissues of certain animals.

Declaration: Text adopted by international conferences or organizations not intended to create binding obligations but merely declares certain aspirations. According to the UN Office of Legal Affairs, a declaration is “a formal and solemn instrument, suitable for rare occasions when principles of great and lasting importance are being enunciated.” 34 UN ESCOR, Supp (No. 8) 15, UN Doc. E/CN.4/1/610 (1962).

Deposit (of a treaty): After a treaty has been concluded, the written instruments, which provide formal evidence of consent to be bound and also reservations and declarations, are placed in the custody of a depositary. Unless the treaty provides otherwise, the deposit of the instruments

of ratification, acceptance, approval, or accession establishes the consent of a state to be bound by the treaty.

Dioxin: Any of the family of compounds known chemically as dibenzo-p-dioxin. It is one of the more toxic man-made chemicals known.

Disposal: Final placement or destruction of toxic, radioactive or other wastes.

DNA—deoxyribonucleic acid: The molecule in which the genetic information for most living cells is encoded.

Dredging: Removal of mud from the bottom of water bodies using a scooping machine. This disturbs the ecosystem and causes silting that can kill aquatic life.

Dump: A site used to dispose of solid wastes without environmental controls.

Dumping: Deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms, or other man-made structures at sea.

Due diligence: The measure of prudence, activity, or attentive care as is expected to be exercised by a reasonable and prudent person under the circumstances, commensurate with the duty to be performed.

Ecology: The relationship of living things to one another and their environment or the study of such relationship.

Economic instruments: Economic incentives and disincentives, such as subsidies or taxes.

Ecosystem: A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit and its non-living environmental surroundings.

Effluent: Wastewater—treated or untreated—that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Emission standard: The maximum amount of polluting discharge legally allowed from a single source, mobile or stationary.

Emission trading: Decreasing pollution from some facilities while increasing it from others, so long as total results are equal to or better than previous limits. Facilities where this is done are treated as if they exist in a bubble in which total emissions are averaged out.

Enactment: A duly adopted law.

Endangered species: Animals, birds, fish, plants, or other living organisms threatened with extinction by man-made or natural changes in their environment.

Enforcement: Executing or making effective; compelling obedience.

Entry into force: The date on which the treaty becomes binding for the states parties. Where the treaty does not specify a date, there is a presumption that the treaty is intended to come into force as soon as all the negotiating states have consented to be bound by the treaty. For multilateral treaties, it is common to provide for a fixed number of states to express their consent for entry into force. Some treaties provide that a certain category of states must be among the consenters. A treaty enters into force for those states that gave the required consent.

Environment: The sum of all external conditions affecting the life, development, and survival of organisms.

Environmental assessment: A written environmental analysis that is prepared to determine whether an action would significantly affect the environment.

Environmental audit: Independent assessment of the current status of a party's compliance with applicable environmental requirements.

Erga omnes: Legal obligations owed to all.

Erosion: The wearing away of land surface by wind or water. Erosion occurs naturally from weather or run-off, but can be intensified by land-clearing practices related to farming, residential or industrial development, road building or timber-cutting.

Estuary: Regions of interaction between rivers and nearshore ocean waters where tidal action and river flow create a mixing of fresh and salt water. These areas may include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds and wildlife.

Eutrophication: The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears.

Exclusive economic zone: Area measured outwards 200 nautical miles from the landboundary (baseline), subject to the specific legal regime established by the UN Convention on the Law of the Sea, under which the coastal state has exclusive rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living.

Executive decree: An order of the executive branch of government having the force of law.

Ex situ conservation: Protection of biological resources outside their normal habitat.

First instance tribunals: The initial court or administrative body hearing a matter in dispute.

Flag state: State of registration of a ship. Every state has the right to sail ships flying its flag. Every state shall fix the conditions for the nationality of its ships and for the right to fly its flag.

Food chain: A sequence of organisms, each of which uses the next, lower member of the sequence as a food source.

Framework convention: Treaty that mainly contains the principles of the cooperation between the contracting states and that has to be completed by other agreements, mainly called protocols, which provide concrete obligations resulting from the main treaty.

Fresh water: Water that generally contains less than 1,000 milligrams per liter of dissolved solids.

Greenhouse gases: Gaseous constituents of the atmosphere, both natural and anthropogenic, which absorb and re-emit infrared radiation. They are the cause of the global warming of the planet.

Genetic resources: Genetic material of actual or potential value.

Habitat: The place or type of site where an organism or population naturally occurs.

Hazardous substance: Any material that poses a threat to human health or to the environment.

Injunction: A prohibitive order issued by a court and directed to a party, forbidding the party to do some act that he has threatened or attempted to commit or restraining him to continue acting in an injurious manner.

Innocent passage: The right of ships to navigate through the territorial sea of a state.

***In situ* conservation:** The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

Lagoon: Shallow body of water, often separated from the sea by coral reefs or sandbars.

Landfill: Disposal site for non-hazardous solid waste at which the wastes are spread in layers.

Mandate: A command, order, or direction, indicating action to be taken.

Meeting of the Parties (MOP): Equivalent to Conference of the Parties (COP), the difference is only a matter of the precise wording of particular treaties. In the major environmental instruments, for example, COP

tends to be used for the convention itself and MOP for the protocols to those conventions.

Mitigation: Alleviation, abatement, limitation or diminution of harm.

Mobile source: Moving producer of air pollution, mainly forms of transportation, such as cars, trucks, motorcycles, airplanes.

Monitoring: Repeated or continuous supervision of performance.

Mutagen: Any substance that can cause a change in genetic material.

Natural person: A human being.

Natural selection: The process by which organisms best adapted to their environment survive while those that do not adapt disappear.

Nutrient: Any substance assimilated by living things that promotes growth.

Ozone depletion: Destruction of the stratospheric ozone layer that shields the earth from ultraviolet radiation harmful to biological life. The destruction of the ozone is caused by the breakdown of certain chlorine- or bromine-containing compounds (chlorofluorocarbons or halons).

Particulates: Fine liquid or solid particles, such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Party of origin: In international trade or investment, the state from which the activity or goods are exported.

Permit: Authorization of an activity that could be harmful for the environment; synonym, license.

Preamble: Introduction to treaties containing the description of principles that guided the contracting parties and preexisting international treaties that have been concluded in the same field.

Protected area: A geographically defined area that is designated or regulated and managed to achieve specific conservation objectives.

Protocol: Sometimes used to mean agreements less formal than those entitled “treaty” or “convention.” More commonly used to designate an instrument subsidiary or supplementary to a treaty, and drawn up by the same parties. A protocol based on a framework treaty is an instrument with specific substantive obligations that implements the general objectives of a previous framework or umbrella convention. The term could be used to cover the following kinds of instruments:

1. A protocol of signature is an instrument subsidiary to a treaty and drawn up by the same parties. Such a protocol deals with ancillary matters, such as the interpretation of particular clauses of the treaty,

those formal clauses not inserted in the treaty, or the regulation of technical matters. Ratification of the treaty will normally *ipso facto* involve ratification of such a protocol.

2. An optional protocol to a treaty is an instrument that establishes additional rights and obligations to a treaty. It is usually adopted on the same day, but is of independent character and subject to independent ratification.
3. A protocol based on a framework treaty is an instrument with specific substantive obligations that implements the general objectives of a previous framework or umbrella convention.
4. A protocol to amend is an instrument that contains provisions that amend one or various former treaties.
5. A protocol as a supplementary treaty is an instrument that contains supplementary provisions to a previous treaty.
6. A proces-verbal, sometimes called protocol, is an instrument that contains a record of certain understandings arrived at by the contracting parties.

Public order: Pertaining to the safety, peace, and good order of the whole community.

Quota: A proportional part or share; quantitative restrictions.

Res judicata: A thing or matter settled by a final judgment. The rule that a final judgment on the merits by a court of competent jurisdiction is conclusive of the rights and duties of the parties.

Ratification: International act whereby a state indicates its consent to be bound to a treaty if the parties intended to show their consent by such an act. In the case of bilateral treaties, ratification is usually accomplished by exchanging the requisite instruments, while in the case of multilateral treaties, the usual procedure is for the depositary to collect the ratifications of all states, keeping all parties informed of the situation.

Recycle/Reuse: The process of minimizing the generation of waste by recovering usable products that might otherwise become waste.

Regional economic integration organization: Organization constituted by sovereign states of a given region by a convention, to which its member states have transferred competence in respect of matters governed by this convention.

Reservation: Declaration made by a state by which it purports to exclude or alter the legal effect of certain provisions of the treaty in their application to that state. A reservation enables a state to accept a multilateral treaty as a whole by giving it the possibility not to apply certain provisions with which it does not want to comply. Reservations can be made when the treaty is signed, ratified, accepted, approved, or acceded to. Reservations

must not be incompatible with the object and the purpose of the treaty. A treaty might prohibit reservations or only allow for certain reservations to be made.

Resolution: A written decision by a conference. Resolutions follow a standard format, which may vary only slightly from body to body. They consist of one sentence and a number of preambular and operative paragraphs.

Retroactivity: Looking backward or contemplating the past. Used for laws that affect acts or facts occurring or rights accruing before the law came into force.

Sanctions: Actions taken against a state for failure to implement an international obligation.

Sediments: Soil, sand, and minerals washed from land into water, which may pile up in reservoirs and harbors, destroying fish-nesting areas and holes of water animals.

Self-executing obligations: Obligations that are capable of immediate judicial enforcement without the need of further legislative or administrative action.

Sewage: Waste and wastewater produced by residential and commercial establishments and discharged into waters.

Soft law: Non-binding international instruments expressing emerging norms and political commitments. Often the precursor to treaty negotiations

SO₂—sulphur dioxide: Gaseous air pollutant, mainly produced by industrial fossil fuel combustion.

Sustainable development: Development that equitably meets developmental and environmental needs of present and future generations.

Species: A taxonomic group whose members can interbreed.

Standards: Prescriptive norms that govern action and actual limits on the amount of pollutants or emissions produced.

Statute: An act of the legislature declaring, commanding, or prohibiting something; a particular law enacted and established by the will of the legislature.

Stratosphere: The portion of the atmosphere that is 10 to 25 miles above the earth's surface.

Strict liability: Liability imposed on one acting without fault, usually because the activity is ultra-hazardous.

Subsidiarity: Making decisions and implementing them at the lowest effective level of government or other organization.

Surface water: All water naturally open to the atmosphere, including springs, wells, and other collectors.

Territorial sea: A maritime zone adjacent to the coast and inland waters of a state, over which the state exercises sovereignty, subject to the right of innocent passage of vessels of other states.

Tort law: The law governing private or civil wrongs or injury. A violation of a duty imposed by general law.

Treaty: A generic term embracing all instruments binding at international law concluded between international entities, regardless of their formal designation. The 1969 Vienna Convention defines a treaty as “an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation.” The 1986 Vienna Convention extends the definition of treaties to include international agreements involving international organizations as parties. There are no consistent rules when state practice employs the terms “treaty” as a title for an international instrument. Usually the term “treaty” is reserved for matters of some gravity that require more solemn agreements. Their signatures are usually sealed, and they normally require ratification.

Troposphere: The lower atmosphere—the portion of the atmosphere between seven and ten miles from the earth’s surface where clouds are formed.

UNEP: UN Environment Program, a subsidiary organ of the UN General Assembly created after the 1972 Stockholm Conference on the Human Environment

Waste: Unwanted materials left over from a manufacturing process or refuse from places of human and animal habitation.

Index

- Aarhus Convention 51, 58, 103–04
Access to biological resources 86, 130,
150–52, 180, 182, 221
Access to justice 38, 51, 57, 58, 101,
102–04, 135, 146, 158, 252
Acid rain 59, 84, 161
Advisory opinions 252, 266–67
African Charter on Human and
Peoples' Rights 61, 238–39
African Convention on the
Conservation of Nature and
Natural Resources 61, 125
Agenda 21 10, 39, 40–41, 44, 45, 50,
59, 85, 100, 112, 128, 150, 157,
164, 197
Agriculture 32, 33, 43, 59, 155, 156,
171, 174, 179, 207, 270
Food and Agriculture Organization
49, 51
Aguinda v. Texaco 69
Air pollution
Acid rain 59, 84, 161
Definition 161, 292
Greenhouse gases 161, 170
Haze Convention 166
Incineration 192, 198, 210, 212,
215, 230
Long-range transboundary 20, 21,
24, 37, 51, 75, 82–83, 100,
101, 122, 124, 161, 163, 166, 258
Ozone-depleting substances 37,
100, 121, 122, 149, 167–69
Trail Smelter arbitration 19, 33, 84,
90, 166, 273
Alien species 182, 187, 189–90
Alps 44
Amazonia 183
American Convention on Human
Rights 239
Amoco Cadiz 213
Animal species
Bats 178, 189
Cetaceans, see also whales 246
Habitats 34, 36, 40, 55, 64, 78, 125,
144, 176, 177, 180, 181, 182,
184–185, 190, 252
Seals 32, 34, 78, 178, 187
Whales 178, 187, 189
Antarctica 5, 7, 16, 23, 25–26, 44, 75,
115, 125, 167
Antigua Convention for the Northeast
Pacific 97, 194
Arbitration 84, 85, 86, 292
Arctic 10, 44, 164, 165, 167, 207, 269
Armed conflict 253–67
ASEAN 166
Convention on Nature Protection
20, 185
Asian Development Bank 63
Atmospheric pollution, see air pollu-
tion
Audits 132–33, 296
Baltic Sea 119, 124, 191, 193, 198,
201, 203, 270
Banks, international
See financial institutions
Banned products 150–51, 152, 209, 252

- Barcelona Convention for the Mediterranean 193–94, 201, 204, 205
- Barcelona Traction Case* 8
- Bats 178, 189
- Bern Convention on Conservation of European Wildlife 55, 70, 78, 125, 184–85
- Best available technology 120–21, 164, 230, 231
- Best environmental practice 121, 198
- Bhopal 146, 160
- Biodiversity
 - Access to biological resources 86, 130, 150–52, 180, 182, 221
 - Alien species 182, 187, 189–90
 - Biosafety 221, 223–24
 - Convention 100, 105, 151, 177, 178–82
 - Definition of 178
 - Habitat protection 34, 36, 40, 55, 64, 78, 125, 144, 176, 177, 180, 181, 182, 184–85, 190, 252
 - Living modified organisms 43, 103, 142, 221
 - Marine living resources 61, 87, 188–90, 193
- Biological resources
 - Access to 86, 130, 150–52, 180, 182, 221–24
- Biosafety 221, 223–24
- Biotechnology 43, 221–24
- Birds 12, 22, 32, 33, 125, 178, 179, 183, 187, 189, 190,
- Black list 123,
- Black Sea 193, 198–99
- Bonn Convention on Migratory Species 125, 182–83
- Bonn Guidelines on Access to Genetic Resources 152–53
- Brundtland Commission, see World Commission on Environment and Development
- Businesses 8, 49, 133, 142, 146
 - Contributions to legal norms 66–67
 - Corporate responsibility 57, 67–68, 69
- Canada 55, 162, 163
- Environmental agreements with United States 32, 62, 63, 109, 149, 160, 161, 166–67, 215
- Trail Smelter* arbitration 19, 33, 84, 90, 166, 273
- Caribbean 237
 - Marine turtles 248
 - Marine environment agreements 59, 74, 194
- Cartagena Biosafety Protocol 221, 223–24
- Catchment areas 44, 157, 159, 198, 232
- Cetaceans 246
- Charter of Economic Rights and Duties 20
- Chemical weapons 255, 257–59
- Chernobyl 21, 23,–24, 37, 52, 218–19, 268
- Chlorofluorocarbons (CFCs) 167–68
- Chorzow Factory Case* 22
- CITES 71, 76, 77, 81, 82, 149, 186–87, 242, 247
- Civil liability 24, 28–29, 56, 96, 130–31, 135–47, 197
- Civil society 65–72, 264, 266, 293
- Climate change 75, 77, 79–80, 90, 105, 108, 112, 113, 119, 129, 133–34, 170–76
- Coastal and marine ecosystems 179, 190–91, 197, 262
- Coastal state jurisdiction 188–89, 193, 196–97
- Codes of conduct 9, 188
- Codex Alimentarius 51, 245, 249, 251
- Commission for Environmental Cooperation 251–52
- Commission on Sustainable Development 50, 70
- Common but differentiated responsibilities 37, 42, 43, 77, 107–08, 118, 172
- Common concern of humanity 13–15, 157, 172, 180, 183, 270
- Common heritage of mankind 15–16, 201
- Common Market 42, 229, 233, 236–37
- Commons areas 28, 125, 247,

- Compliance mechanisms 2, 8, 11,
18–29, 45, 48, 57–58, 69–71,
79–84, 131, 132, 135, 169, 175–76,
177, 217, 229, 242, 248
- Conference of the Parties 49, 79–81,
168, 173, 182, 189, 213, 294
- Conference on Security and
Cooperation in Europe 57–58
- Conservation
Antarctic Seals 78
Bern Convention 55, 70, 78, 125,
184–85
Migratory species 125, 182–83
- Consumer action 70
- Continental shelf 188, 194,
- Contingency planning 59, 95
- Convention on Biological Diversity
100, 105, 151, 177, 178–82
- Convention on International Trade in
Endangered Species (CITES)
71, 76, 77, 81, 82, 149, 186–87,
242, 247
- Convention on Long-Range
Transboundary Air Pollution 20,
21, 24, 37, 51, 75, 82–83, 100,
101, 122, 124, 161, 163, 166, 258
- Convention on Nature Protection and
Wildlife Preservation in the
Western Hemisphere 33, 58, 183,
242
- Convention on the Conservation of
European Wildlife and Natural
Habitats 55–56, 78, 125, 184–85
- Conventions, see treaties
- Cooperate, duty to 12–13, 36, 38, 94,
158, 168, 188, 189, 194, 197, 203,
206, 213, 218, 253,
- Cooperative Program for Monitoring
and Evaluation (EMEP) 100,
163–64
- Coral reefs 179, 187, 191
- Corfu Channel* case 33
- Corporations 8, 49, 133, 142, 146
Contributions to legal norms 66–67
Corporate responsibility 57, 67–68,
69
- Cost/benefit analysis 97, 119
- Council of Europe 55–56, 184
- Crimes 86, 148–49
- Criminal law 148–49
- Critical loads 124, 164, 165
- Cultural and minority rights 83,
239–40
- Customary international law 2, 3, 8, 9,
12, 15, 16–17, 36, 38, 42, 68, 78,
88, 89, 198, 218, 253, 254–60, 266,
271
- Damages 17, 22, 131, 140–47, 220,
228, 260–66
- Dams, see also Gabcikovo-Nagymaros
Case 64, 113, 144, 257
- Danube River 156
Convention to Protect 82, 159
Gabcikovo-Nagymaros Case 15, 16, 85,
108
- Debt for nature exchanges 154
- Debt, international 59, 106, 150,
152–54
- Definitions
Air pollution 161, 292
Atmosphere 292
Best available techniques 120
Best environmental practice 121
Biological diversity 178
Biosphere 202
Biotechnology 221, 292
Bunker oil 140
Conservation status 125
Critical load or level 124
Ecosystem diversity 179
Endangered 295
Damage 27, 141, 147
Discharge 200
Dumping 295
Environment 27
Genetic diversity 179
Habitat 186
Hazardous activity 28
Haze pollution 166
Human security 268
International law 2
Pollution 90
Species diversity 179
Treaty 3–4, 301
Watercourse 156–57
Wastes 210, 214
- Desertification 13, 43, 48, 105, 112

- Detergents 55, 122
- Developing countries 13, 34–39,
41–42, 51, 54, 63–65, 67, 77,
105–106, 128, 134, 150, 152–54,
156, 166, 168, 169, 172, 173–75,
180, 181, 182, 188, 195, 208, 210,
212, 215, 221
- Dispute settlement 17, 54, 71, 84–88,
118, 248, 252
- Doe v. Unocal* 68–69
- Driftnets 22, 60, 121, 187, 188
- Due diligence 20, 23, 27, 28, 91–92,
120, 304
- Dumping 11, 21, 38, 59, 60, 61, 78,
91, 100, 111, 123, 126, 149, 161,
191–94, 198–201, 214, 215, 220,
258
- Economic Commission for Europe
(UNECE) 50, 51, 162
- Economic instruments 41, 95,
127–135, 174, 295
- Ecosystems 14, 36, 44, 76, 90, 93, 124,
147, 157, 158, 165, 170, 171, 177,
179, 181, 185, 189
- Emergencies 25–26, 40, 42, 60, 88, 94,
99, 160, 195, 199, 201, 203–06,
217
- Emissions 21, 33, 54, 67, 75, 77, 83,
120–22, 133–34, 160–65, 172–75,
231, 236
- Endangered species 43, 50, 73, 75, 76,
78, 83, 123, 125, 149, 177, 183,
186, 189, 194 247–48
- Energy 10, 42, 52, 59, 67, 90, 120, 131,
137, 154, 160, 164, 167, 173–74,
198, 203, 216
- Enforcement 17, 18, 26, 32, 47, 48,
60, 62, 63, 79, 81, 121, 124, 184,
187, 238, 244, 249, 252
- International 7, 149–54
- National 135–49
- Environmental audits 131, 132
- Environmental impact assessment 40,
92, 103, 112, 113, 114, 116, 132,
154, 181, 182, 194, 215, 259,
- Environmental justice 41, 101–06,
- Environmental management 57, 60,
132, 133
- Environmental rights 135, 238, 240
- Equality 77, 101–02, 104, 109, 146,
237
- Erosion 91, 191, 194, 270
- Europe 50, 51, 55, 56, 57, 64, 100,
126, 133, 136, 144, 160, 162, 163,
164, 183, 184, 229, 232, 235, 264,
269, 270
- European Bank for Reconstruction
and Development 63
- European Community, see European
Union
- European Energy Charter 42
- European Landscape Convention 56
- European Union 1, 89, 97, 112, 132,
162, 208, 209, 214, 225, 226, 227,
229
- Action programs 225, 236
- Air pollution control 229–31
- Biotechnology 234–35
- Commission 226–27
- Council 226–27
- Directives 229
- Environmental impact assessment 229
- Environmental policy 225
- European Court of Justice 227–28
- European Parliament 227–28
- Hazardous waste 233–35
- Noise pollution 235–36
- REACH 210–11
- Regulations 229
- Treaties 225–26
- Water policy 231–33
- European Water Charter 55
- Exclusive economic zone 61, 151, 188,
189, 193, 196
- Exxon Valdez 139, 203
- Financial assistance 77, 128, 129
- Financial institutions 63–65, 116, 152
- Global Environment Facility 65
- Pelosi Amendment 153
- Regional banks 63, 116
- UN Compensation Commission 261
- World Bank 63, 64, 65, 116, 119,
152, 153
- Fisheries 14, 49, 59, 100, 108, 129,
130, 171, 187, 188, 189, 194, 232,
236, 250, 262

- Flora and fauna 92, 123, 125, 149, 184, 185, 186, 194, 220
- Food and Agriculture Organization (FAO) 49, 51, 53, 127, 130, 134, 151, 152, 155, 177, 188, 209,
- Forests 21, 39, 45, 51, 59, 100, 105, 155, 162, 171, 173, 185, 189, 229, 237, 255,
- Forum non conveniens 146
- Foster v. Nielsen* 16
- Framework agreements 75
- Framework Convention on Climate Change (UNFCCC) 98, 105, 133, 173, 175
- Fresh waters 37, 159, 233
- Future generations 14, 16, 28, 31, 32, 36, 85, 92, 93, 97, 98, 104, 106, 172, 178, 181, 183, 184, 272
- Gabčíkovo-Nagymaros Case 15, 20, 85–86, 108
- Gasoline 162, 170, 230, 245
- General Agreement on Tariffs and Trade (GATT) 54, 105, 118, 121, 129, 150, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251
- General Assembly, see United Nations
- General principles of law 3, 8, 89, 159, 181, 203, 255
- Genetically modified organisms, see living modified organisms
- Genetic resources 51, 86, 151, 152, 180, 181, 182, 221, 222
- Geneva Convention on Long Range Transboundary Air Pollution 20, 75, 163, 258
- Global commons 28, 125, 247
- Global Environment Facility (GEF) 65
- Global Environmental Monitoring System (GEMS) 52
- Global organizations 50
- Global warming 170, 171, 172, 268
- Governance 17, 43, 69, 70, 98, 103, 240, 268, 269, 270
- Grants and subsidies 96, 128–30
- Gray lists 123
- Great Lakes 32, 62, 167
- Greenhouse gases 18, 134, 161, 170, 171, 172, 173, 174, 175, 189, 243
- Groundwater 113, 122, 156, 232, 262, 270
- Gulf region 264
- Gulf War 253, 255, 260, 264
- Habitats 34, 36, 40, 55, 64, 78, 125, 144, 176, 177, 179, 180, 181, 182, 184, 185, 186, 190, 194, 252
- Harm
- Assessment of potential 113–17
- Environmental and state security 267–70
- Gulf War 263–66
- Military activities causing 253, 256, 261
- Polluter pays for 95–97
- Prevention of 90–94
- Redress 252
- Risk of 117–19
- State responsibility for 19–23
- Strict liability for 23–29
- Hazardous substances 100, 123, 139, 144, 203, 206–09, 216, 233, 252
- European Union law 233–35
- FAO 127, 209
- Labeling 134
- OECD 127
- Pesticides 152, 209
- POPs 165, 208–09
- Prior informed consent 150–52
- Hazardous wastes 13, 38, 43, 61, 77, 119, 136, 141, 210–15, 230, 237, 258
- Bamako Convention 38, 61, 214–15
- Basel Convention 38, 81, 124, 127, 142, 149, 242, 212–14
- Civil liability 142
- Definition 210–11
- Dumping at sea 11, 60, 78, 100, 111, 193, 214, 215, 220
- Incineration 192, 198, 210, 212
- Liability for movement 142
- Prior informed consent 212
- Radioactive wastes 220
- Regional regulation 60, 214–15
- Trade and transport 211–12
- Health, right to 238–39
- Helsinki Conference on Security and Cooperation in Europe 163

- High seas 4, 5, 14, 15, 23, 32, 73, 137, 147, 176, 187, 189, 192, 193, 195, 196, 201, 206
- Human environment, see Stockholm Conference on
- Human rights 5, 13, 14, 35, 36, 42, 56, 61, 68, 83, 109, 235–41, 266, 268, 271, 272
 - Access to justice 38, 51, 57, 58, 101, 102–104, 135, 146, 158, 252
 - African Charter 238–39
 - Complaints 240–41
 - Constitutional provisions 241
 - Indigenous peoples 40, 64, 239–40
 - Information, right to 40, 51, 58, 69, 102–03, 240
 - Right to water 109
 - To a safe and healthy environment 238–39, 240
- Humanitarian law 42, 265, 266, 267
- Hunting 32, 121, 125, 176, 182, 190
- Hungary 218

- Impact assessment, see environmental impact assessment
- Implementation 10, 11, 25, 40, 41, 44, 45, 48, 49, 50, 52, 60, 63, 64, 66, 70, 79, 80, 81, 82, 83, 84, 98, 102, 105, 108, 128, 132, 133, 134, 149, 150, 153, 154, 159, 164, 173, 174, 175, 182, 183, 184, 197, 209, 214, 219, 223, 227, 231, 233, 252, 257, 270, 272
- Incentives 8, 66, 77, 126, 127, 128, 129, 130, 133, 135, 173, 181
- Incineration 192, 198, 210, 212, 215, 230
- Indigenous peoples 40, 64, 239–40
- Industry 21, 28, 66, 67, 96, 122, 129, 130, 131, 134, 137, 146, 154, 155, 156, 209, 212, 216, 257
- Information, right to 40, 51, 56, 69, 102–03
- Inspection Panel, World Bank 64
- Institutions, see international institutions
- Integrated approach 39, 112, 190, 197, 199, 232
- Intellectual property 54, 180, 198, 244,
 - Inter-American Development Bank 63
 - Intergenerational equity 31, 106
 - International Atomic Energy Agency 10, 52, 201, 216
 - International Bank for Reconstruction and Redevelopment
 - International Civil Aviation Organization 53
 - International Committee of the Red Cross 42, 260
 - International Court of Justice 3, 5, 8, 15, 20, 33, 85, 91, 265, 266
 - Advisory opinions
 - Dispute settlement
 - International Criminal Court 86
 - International environmental law 23, 24, 66, 71, 149, 156, 158, 162, 165, 168, 191, 272, 274
 - Action plans 10, 112, 193, 231, 235
 - Agenda 21 10, 39, 40–41, 44, 45, 50, 59, 85, 100, 112, 128, 150, 157, 164, 197
 - Codes of conduct 9, 188
 - Customary norms 2, 3, 8, 9, 12, 15, 16–17, 36, 38, 42, 68, 78, 88, 89, 198, 218, 254–260, 266, 271
 - Dispute settlement 17, 54, 71, 84–88, 118, 248, 252
 - Economic measures 41, 95, 127–135, 174, 295
 - Environmental impact statements 40, 92, 103, 112, 113, 114, 116, 132, 154, 181, 182, 194, 215, 259
 - Environmental management 57, 60, 132, 133
 - Foundations of 1–3
 - General principles of 3, 8, 89, 159, 181, 203, 255
 - History 31–46
 - Human rights and 35–36, 237–41
 - International conventions 3–8
 - International organizations concerned with 47–65
 - Judicial decisions 85–86
 - Licensing and permitting 111, 121, 126–27
 - National law and 16–17
 - Origin and evolution of 31–46
 - Principles of 89–110

- Prior informed consent 43, 127, 150–52, 180, 182, 209, 223
- Regulatory measures 111, 120–23
- Restrictions and prohibitions 123–25
- Rio Conference 10, 20, 39–42, 128, 150, 154, 157, 164, 172, 177, 197, 253
- Risk assessment 117–19
- Sources of 3–11
- Standard-setting 121–23
- Stockholm Conference 34–37
- Strategic environmental evaluation 119–20
- Sustainable development 13, 14, 38–39, 41, 44, 50, 59, 93, 97–98
- UNEP, role of 50
- World Summit on Sustainable Development 44–46
- International institutions 47–6
- International Labor Organization 53
- International law
 - Compliance with 2, 8, 11, 18–29, 45, 48, 57–58, 69–71, 79–84, 131, 132, 135, 169, 175–76, 177, 217, 229, 242, 248
 - Conventions 3–8, 75
 - Crimes 86, 148–49
 - Customary 2, 3, 8, 9, 12, 15, 16–17, 36, 38, 42, 68, 78, 88, 89, 198, 218, 253, 254–60, 266, 271
 - Definition 2
 - Dispute settlement 17, 54, 71, 84–88, 118, 248, 252
 - Enforcement 17, 18, 26, 32, 47, 48, 60, 62, 63, 79, 81, 121, 124, 149–54, 184, 187, 238, 244, 249, 252
 - General principles of law 3, 8, 89, 159, 181, 203, 255
 - In United States law 16–17
 - Non-binding norms 8–11
 - Opinio juris 3, 8
 - Reciprocity 4–5, 17, 74, 102, 142, 273
 - Sources of 3–11
 - Sovereignty 7, 11–12
 - State responsibility 19–23
 - Treaties 3–8, 75
- International Law Commission 27, 50
- International Maritime Organization 52–53
- International organizations, see international institutions
- International treaties, see treaties
- International Tribunal on the Law of the Sea 13
- International Union for the Conservation of Nature 10, 69, 70, 71, 177
- International watercourses 44, 50, 91, 92, 100, 108, 144, 156, 157–58, 202, 257
- International Whaling Convention 14
- Interpol 148
- Inventories 98, 100, 172, 173, 175
- Iraq 253, 260–65
- Irreversible harm 45, 90, 91, 94–95
- Judicial decisions 13, 85–86, 108
- Jurisdiction 136–45
- Kyoto Protocol 173–76
- Labeling 54, 66, 111, 117, 134–35, 209, 220, 229, 249
- LaGrand Case* 16
- Land-based marine pollution 45, 113, 123, 141, 187, 192, 194, 198, 202–03, 233, 252
- Land mines 259
- Landscapes 147, 155, 264, 271
- Land use 11, 53, 125–26
- Law of the sea 190–206
- Liability 19, 23, 29, 34, 36, 40, 50, 53, 56, 67–68, 96, 102, 131, 135–147, 208, 209, 214, 215, 218, 219, 220, 259, 260–65
- Licensing and permitting 111, 121, 126–27
- Living modified organisms 43, 103, 142, 221
- Living resources, see biodiversity
- Loans 116, 129, 136, 152–54
- Lugano Convention 56, 142–43
- Madrid Protocol on Environmental Protection in Antarctica 25, 44, 67, 115

310 Guide to International Environmental Law

- Marine environment 190–206
 - Baltic Sea 119, 124, 191, 193, 198, 201, 203, 270
 - Black Sea 193, 198–99
 - Caribbean 59, 74, 194, 237, 248
 - Coastal state jurisdiction 188–89, 193, 196–97
 - Coral reefs 179, 187, 191
 - Dumping 11, 60, 78, 100, 111, 193, 214, 215, 220
 - Emergencies 195, 199, 201, 203–06
 - Fishing 14, 49, 59, 100, 108, 129, 130, 171, 187, 188, 189, 194, 232, 236, 250, 26
 - Flag state jurisdiction 195–95, 199–201
 - High seas 4, 5, 14, 15, 23, 32, 73, 137, 147, 176, 187, 189, 192, 193, 195, 196, 201, 206
 - Historical development 192–94
 - Indian Ocean 194
 - Land-based pollution 202–03
 - Living resources 61, 87, 188–90, 193
 - MARPOL 199–200
 - Mediterranean 57, 74, 75, 186, 191, 193–94, 201, 203, 215, 270
 - North-East Atlantic 95, 99, 120, 198, 203
 - Port state jurisdiction 196
 - Radioactive waste 200, 201
 - Red Sea 74, 194
 - Regional seas agreements 192, 197–99
 - Sea-bed activities 201–202
 - UNCLOS 194–97
- Marine living resources 61, 87, 188–90, 193
- Marine pollution 190–206
- MARPOL 199–200
- Mediterranean 57, 74, 75, 186, 191, 193–94, 201, 203, 215, 270
- Mexico 62, 63, 149, 160, 215, 246
- Migratory species 10, 71, 76, 125, 182–83, 248
- Military activities 253–67
- Monitoring 70, 71, 83, 91, 98–100, 111
- Montreal Protocol 112, 121, 122, 128, 149–150, 169–70
- Moon 16, 24, 216–17
- Motor vehicles 21, 122, 164, 236
- Mountain ecosystems 44
- MOX Plant Case 13
- National law 16–17, 68, 136, 141, 148, 212, 259
- National parks 115, 154, 186
- Noise pollution 122, 123, 154, 235
- Non-binding instruments 8–11
- Non-governmental organizations 4, 34, 39, 40, 63, 69–71, 266
- North American Agreement on Environmental Cooperation 63
- North American Free Trade Agreement 41, 42, 62, 88, 149–50, 251–52
- North Atlantic Treaty Organization 274–75
- North-East Atlantic 95, 99, 120, 198, 203
- North Sea 198, 270
- Nuclear accidents 37, 218–19
- Nuclear safety 52, 216, 217
- Nuclear weapons 20, 33, 42, 60, 61, 216–17, 259, 265
- Ocean, see marine
- Oil pollution
 - Accidental
 - Amoco Cadiz 213
 - Flag state jurisdiction 195–95, 199–201
 - IMO 52–53
 - MARPOL 199–200
 - Port state control 196
- Organization for Economic Cooperation and Development 9, 41, 55, 56–57
- Organization for Security and Cooperation in Europe 55, 57–58
- Organization of African Unity/African Union 62, 214
- Organization of American States 58–59
- Outer space 18, 23, 24, 25, 73, 216, 255
- Ozone Convention 6, 37, 75, 77, 108, 121, 128, 149, 168–70

- Ozone depleting substances 21, 37, 67, 100, 121, 167–68
- Pacquete Habana* 17
- Parks, see protected areas
- Penal law, see criminal law
- Permits, see licensing
- Persian Gulf 74, 194, 262
- Persistent organic pollutants (POPs) 165, 208–09
- Pesticides 33, 43, 122, 134, 151, 156, 177, 191, 207–09
- Pharmaceuticals 122, 207, 212, 223
- Polar bears 186, 189
- Polar regions 10, 44, 164, 165, 167, 207, 208
- Polluter pays principle 95–97
- Polymetallic nodules 191
- Port state jurisdiction 196
- Poverty 13, 40, 42, 44, 59, 97, 105, 152, 182
- Precautionary principle 40, 42, 46, 68, 88, 89, 90, 94–95
- Prevention 90–94
- Principles 89–110
- Prior informed consent 43, 127, 150–52, 180, 182, 209, 223
- Private enterprise 65–69, 145–46
- Privacy, right to 240
- Process standards 91, 121, 243
- Property, right to 238, 239–40, 244, 256, 264, 272
- Protected areas 49, 58, 125–26, 154, 178, 181, 182, 185, 186, 194, 232, 252
- Quality standards 33, 121, 123, 159, 231, 232
- Radioactive substances 24, 38, 206–07, 260
- Radioactive wastes 52, 57, 59, 60, 61, 113, 200, 201, 211, 214–20, 269
- Ramsar Convention on Wetlands 34, 51, 70, 71, 82, 93, 125, 178, 186
- REACH 210–11
- Red Sea 74, 194
- Refugees 253, 267–68
- Regional seas agreements 192, 197–9
- Remedy, right to 41, 102–03
- Reparations 7–8, 18
- Religion 31, 239
- Remedies 22, 28, 40, 45, 82, 101–02, 135, 270, 274
- Reporting 41, 71, 81–84, 99, 134, 164, 174, 216
- Responsibility, see state responsibility
- Restrictions and prohibitions 123–25
- Rhine River 99, 124, 156, 160, 198, 209
- Rights, see human rights
- Rio Conference, see UNCED
- Rio Declaration 12, 13, 20, 39, 59, 94, 97, 100, 101, 102, 103, 107, 128, 164, 253
- Risk 19, 23, 27, 28, 93, 95, 99, 101, 112, 117–19, 261, 262, 262, 264, 265, 266, 269
- Rivers, see international watercourses
- Sanctions 11, 62, 136, 148, 197, 227, 246
- Sanitary and Phytosanitary Agreement 54, 244–45, 250–51
- Sarei v. Rio Tinto* 69
- Science 52, 249
- Seabed 201–02
- Seals 32, 34, 78, 178, 187
- Secretariats 83
- Sectoral approach 37, 43, 180
- Settlement of disputes 17, 54, 71, 84–88, 118, 248, 252
- Sewage 156, 210
- Shared resource management 12, 37, 38, 108–09
- Shrimp/turtle case 247–49
- Soft law 8–11
- Soil 45, 51, 55, 171, 191
- Sosa v. Alvarez-Machain* 68
- Sources of law 3–11
- Sovereignty 7, 11–12
- Standards 121–23
- State reporting 41, 71, 81–84, 99, 134, 164, 174, 216
- State responsibility 19–23
- Stockholm Action Plan 35, 235
- Stockholm Conference 34–37
- Stockholm Declaration 35–37

312 Guide to International Environmental Law

- Strategic environmental evaluation 119–20
- Stratosphere 73, 155, 160, 167–70
- Sub-regional organizations 49, 59, 61, 62–63, 183
- Subsidiarity 226
- Subsidies 54, 96, 128–30, 250
- Sustainable development 13, 14, 38–39, 41, 44, 50, 59, 93, 97–98
- Tankers 33, 52–53, 122, 199–200, 203, 261
- Torrey Canyon 34, 192, 193, 203
- Tourism 26, 115, 191, 203, 232
- Toxic substances, see hazardous substances
- Trade 202, 207, 209, 221, 226, 237, 241–53
- Trail Smelter* arbitration 19, 33, 84, 90, 166, 273
- Transboundary pollution, see trans-frontier pollution
- Transfrontier pollution 19, 20, 22, 23, 31, 33, 56, 57, 90, 91, 101–02, 157, 161
- Treaties 225–26
- UNCED 10, 39, 40, 42, 50, 69, 85, 157, 164, 177, 181, 237
- Uncertainty 22, 45, 96, 117, 119, 222
- UNCLOS 194–97
- UNESCO 51, 82, 93, 177, 186, 201
- United Nations
 - Compensation Commission 261–66
 - Development Program 65
 - Economic Commission for Europe 50, 162
 - Environment Program 50
 - General Assembly 9, 12, 19, 25, 27, 35, 38, 50, 67, 99, 183, 172, 237, 256, 260, 266
 - Security Council 50, 259, 261, 264
- United Nations Environment Program 50
- United States 2, 107, 112, 223, 264, 269
 - Agreements with Canada 32, 62–63, 109, 149, 166–67, 215
 - Agreements with Mexico 62, 149, 215, 269
 - Alien Tort Statute 68–69
 - Boundary waters 32, 62, 109, 167
 - Great Lakes Water Quality 32, 62, 167
 - NAFTA 41, 42, 63, 88, 149–50, 251–52
 - Oil Pollution Act 1990 139
 - Pelosi Amendment 153
 - Reformulated Gas Case 245–46
 - Shrimp-turtle dispute 247–79
 - Tuna-dolphin dispute 246
 - Treaties in 4, 16–17, 75, 80
 - United States v. Locke* 17
- Vessel source pollution 194, 199–201
- Vienna Convention on the Law of Treaties 3, 4, 78, 86
- Volatile organic compounds 124, 165
- War, see armed conflict
- Waste 13, 38, 43, 61, 77, 119, 136, 141, 210–15, 230, 237, 258
 - Bamako Convention 38, 61, 214–15
 - Basel Convention 38, 81, 124, 127, 142, 149, 242, 212–14
 - Civil liability 142
 - Definition 210–11
 - Dumping at sea 11, 60, 78, 100, 111, 193, 214, 215, 220
 - Incineration 192, 198, 210, 212
 - Liability for movement 142
 - Prior informed consent 212
 - Radioactive wastes 220
 - Regional regulation 60, 214–15
 - Trade and transport 211–12
- Watercourses, see international watercourses
- Wetlands 34, 51, 70, 71, 82, 93, 125, 178, 186
- Whales 178, 187, 189
- Wilderness, see protected areas
- Wildlife, see biodiversity, migratory species
- Wise use 16, 93,
- World Bank 63, 64, 65, 116, 119, 152, 153,
- World Charter for Nature 20, 70, 99, 177,

- World Commission on Environment and Development 44–46
- World Conservation Union 10, 69, 70, 71, 177
- World Health Organization 42, 49, 51
- World Heritage Convention 51, 71, 125
- World Meteorological Organization 52
- World Summit on Sustainable Development 20, 44, 97, 156
- World Trade Organization 243–50
- World Wide Fund for Nature 69, 71, 177
- Zoning 125–26