Legal Definitions of the Environment and of Environmental Damage

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The major cause of pollution and other environmental damage is said to be the increased population in the world, and it is clear that all human activities have effects, including negative and harmful, on the environment. It is also clear that environmental problems have changed character over time, or at least *discussion* of them has. In the 1960s, issues concerning oil casualties and use of pesticides were on the agenda. During the 1970s, the major cause of damage concern was point sources, i.e. emissions from large industrial plants, and chemicals. During the 1980s, non-point sources, i.e. diffuse emissions from numerous small activities, came into focus. A typical example is car emissions. Transport, agriculture, and trade in products for consumption were major components of the discussion. Further issues attended were the ozone layer[1] and climate together with waste management. Today, the protection of biological diversity and natural resources, as well as remedying contaminated land, are being highlighted. This change of direction could be due to the findings of the 1987 Brundtland Report[2] and progress in ecological economics. Before the Brundtland Report was published the discussion centered on an issue-by-issue approach and environmental threats were thought of as rather distinct. Today, ecology and development are clearly linked to gain "sustainable development". Environmental issues are to be integrated into all other discussions in line with a 'multi-media' approach, and efforts are made to change consumer behaviour. Restitutive law has also developed. With historical roots in nuisance law and neighbour law, in turn originating from corpus juris civilis, traditional environmental tort law focuses on protection of privately owned property and values, while contemporary discussion focuses on publicly owned ecological values to be protected and repaired if damage occurs. Thus, one trend is a shift from reparation for damaged private interests to clean-up and restoration of the environment per se as community protection.

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1 The hole over Antarctica was discovered in 1985, but the chemical processes were scientifically proven in the early 1970s - work for which the Nobel Prize was awarded in 1995.

2 The World Commission on Environment and Development, *Our Common Future*, 1987.

This alteration of scope affects the discussion of definitions of damage and liability for remedies. A second generation of definitions tends to be broader and include almost every component of ecology and human value in order to gain flexibility. In like manner, further sources could subsequently be included for prevention of future damage in accordance with new knowledge. Here lies the fundamental problem, the lack of consensus among scientists as well as the lack of information on adverse effects. However, definitions could develop equally from increased knowledge and from priorities in combat.

With the ambition to expose the legal technique used and its development, a general discussion of legal definitions (1) is followed by a survey of special definitions (2) applicable to protection of the marine environment and aiming at the protection of air and the atmosphere. Some examples of comprehensive definitions adopted during the past few years will be displayed (3) and the article ends with conclusions (4).

1 Definitions in General

All discussions concern the same subject, the *environment*. In its broadest sense, environment is defined as including water, air, soil, flora and fauna.[3] In the 1972 Stockholm Declaration also "especially representative samples of natural ecosystems" are included in the definition.[4] The term "environment" could be said to cover "all those elements which in their complex inter-relationships form the framework, setting and living conditions for mankind, by their very existence or by virtue of their impact".[5] Another suggestion is taken from the New Zealand Environment Act of 1986, where the environment is defined as including:

> "a) ecosystems and their constituent parts;
> b) all natural and physical resources;
> c) the social, economic, aesthetic and cultural conditions which affect the environment or which are affected by changes to the environment."[6]

The legal approach to "the environment" is to separate regulations into broad categories. Salter has suggested three groups. Under a heading of "natural" environment, protection of environmental media is included. A second category is the "man-made" environment including the cultural heritage. A third category concerns "human" environment, including regulations on food content, products, safety issues, leisure and economic health (consumer protection, eco-labelling, and so forth).[7] Further categories

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3 The English Environment Protection Act 1990, defines the "environment" as consisting "of all, or any, of the [media] the air, water and land; and the medium of air includes the air within buildings and the air within other natural or man-made structures above or below ground", see Section 1(2).

4 See Principle 2 in the Declaration of the UN Conference on Human Environment, Stockholm 1972, published in Molitor (ed), *International Environmental Law*, Primary Materials, 1991, p 81.

5 EEC OJ C 115, May 1976, p 2.

6 Cited in International Bar Association (IBA), *Environmental Liability*, Chairman P Thomas, 1991, by R J Somerville, *Environmental Audit: Insurance; Indemnities and Proposals for Reform in New Zealand Environmental Law*, p 355.

7 Cf J R Salter, *European Environmental Law*, International Environmental Law and Policy Series, 1994 (loose-leaf). Rodgers uses the categories of "human" (including health, social and other man-made conditions) versus "natural" (including the physical condition of the land, air and water)

could be indoor and working environment, but in Salter's distinctions these should probably be treated as sub-categories of a "man-made" environment.[8] This article is primarily concerned with the "natural" environment in Salter's classification.

Turning to definitions of *environmental damage*, a current working distinction is to separate the issues into three categories. Global issues focus on deforestation, desertification, the depletion of the ozone layer and climate changes due to global warming (the greenhouse effect). The discussion concerning regional environment focuses on transboundary pollution and the management of ecological areas, such as wetlands, and migratory species. At local level, the national environment, industrial risks, finite action and household effects (neighbours, waste management, product choices, and so on) are in focus. It could be questioned whether this kind of geographical distinction is useful from an environmental view, since growing knowledge shows that all kinds of pollution, all sources and all origins interact, more or less. Air pollution and soil contamination affect water and vice versa. Pollution and natural resources know no political frontiers. All national pollution will, sooner or later, end up at international/global levels and vice versa. Examples are emissions from England that end up in acid rain in Scandinavia, and water pollution in Norway which, after passing international waters, reaches Russia. Oil casualties reach coastal states and could affect freshwater supplies. Flooding in the Netherlands and Germany causes pollution of English and Norwegian coastlines. Such interactions put high demands on the regulations and the definitions of damage if compensation and restitution are to be achieved. However, to achieve results in prevention, control and reparation, the most effective level of discussion must be - and is - sought. Global issues are addressed at global level, and so forth.

A multitude of sources and causes, as well as complex occurrences, require further sophistication. A basic distinction concerns a separation of *sources*, i.e. the activity causing the damage. The regulations focus on either movable sources or immovable sources. Movable sources are addressed through rules concerning e.g. traffic and transport. Immovable sources include land-based or sea-based (platforms) installations. Cross-cutting, transsectoral, regulations concern pipelines, chemical substances and waste as sources of damage.

Further, the cause of damage may be differentiated in *time perspective* (past, present or future occurrences) and in *temporal character* (accidental, gradual or old burden). The former distinction concerns primarily the application of regulations and here the issue of retroactivity is of importance. Temporal character has been developed under insurance law. A sudden and accidental occurrence usually relates to a point source and a finite act; the effect - the damage - is instant. An oil casualty at sea is a typical case. Concerning a gradual implication, the main characteristic is a perdurative or a creeping cause of an event over time. For old burdens, the historic causation is significant. Usual causes are buried drums containing chemicals and waste sites that eventually leak. The

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environment, see W H Rodgers, *Environmental Law*, 1977 (hereinafter Rodgers 1977), p 1.

8 Backer uses the categories social, physical, internal (working environment) and external (natural) environment, see I L Backer, Innføring i naturresurs- og miljørett, 2 ed Oslo 1995, p 25. Sands notes "four possible elements" included in international acts, "(a) fauna, flora, soil, water, and climatic factors; (b) material assets (including archaeological and cultural heritage) (c) the landscape and environmental amenity; and (d) the interrelationship between the above factors", see P Sands, *Principles of international environmental law*, Vol 1 Frameworks, standards and implementation, 1995 (hereinafter Sands 1995), p 629.

same model of categories applies to the character - the effect - of damage. Scientifically, current damage is a product of past and present exposures to pollution, especially under chronic conditions. Another example is instances with a latent period between exposure and the appearance of damage, e.g. the development of cancer decades after exposure. It is evident that transitions between the categories are difficult to determine, and that the model serves merely explanatory purposes.[9]

The term *pollution*, or pollution damage, is often used interchangeably with the term environmental damage, but could have a broader conceptual meaning.[10] Springer identifies various meanings of the term. First noting that "[t]he word 'pollution' has been used in two distinct senses: first, to indicate any alteration in a given environment, and, secondly, to indicate a threshold level of damage or interference which is legally significant", Springer takes things further: pollution could be defined under a range of approaches, as any alteration of the existing environment; as the right of the territorial sovereign; as damage; as interference with other uses of the environment; or as exceeding the assimilative capacity of the environment.[11] Rodgers discusses the term in an application of planetary housekeeping, defining pollution as "a resource out of place", and includes the ideas that a pollution problem is not solved by "shifting a resource from one place to another", such as trading an air pollution problem for a water pollution problem; that the definition "connotes waste as well as mismanagement" from a pollution control perspective; and finally that the "use of resources and their value is measured by reference to human needs".[12] Still, both use the term to describe effects of human use of the environment, and as concluded by Springer, the "key issue" is to find the criteria for making the pollution threshold, i.e. pollution damage, legally enforceable.[13]

A distinction is also made between the terms *contamination*, i.e. the mere presence of a foreign - possibly harmless - substance, and pollution, which poses or causes harm. In the schemes for remedying contaminated land such distinctions are to a large extent ignored.[14]

A last distinction as to definitions must be noted, the basic separation between damage and *compensable* damage. Springer has suggested that "the most useful methodological distinction is made between damage to man and his property and damage to the environment".[15] In contemporary debate, such distinctions are being discussed in terms of privately owned versus publicly unowned property.

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9 Cf P W J Saunders, *The estimation of pollution damage*, 1976 (hereinafter Saunders 1976), pp 2 and 68.

10 Sands argues that the "concept of pollution" provides some assistance for definitions of environmental damage "but cannot be used interchangeably" since it "actually [does] not define it", although providing guidance in "determining the threshold beyond which environmental damage might trigger liability", Sands 1995, pp 633-634.

11 A L Springer, *Towards a meaningful concept of pollution in international law*, International and Comparative Law Quarterly, Vol 26 1977, p 531 et seq (hereinafter Springer 1977). See also C Redgwell, *Compensation for Oil Pollution Damage, Quantifying Environmental Harm*, Marine Policy, March 1992, p 90 et seq, discussing pollution as damage.

12 Rodgers 1977, pp 1-3.

13 Springer 1977, pp 550 and 556-557.

14 See the remarks by S Tromans and R Turrall-Clarke, *Contaminated Land*, 1994, p 3.

15 Springer 1977, p 537.

Damage to the environment is defined in the instruments of environmental law, and includes all adverse effects on man, his artefacts and the environment.[16] Compensable damage is defined in schemes of restitution and liability, and embraces only economic losses, or rather harm expressed in economic terms.

With all these distinctions in mind, we can now turn to definitions as they are enunciated in various instruments.

In the 1972 Stockholm Declaration and the 1992 Rio Declaration,[17] the principles only refer to "pollution" to be prevented in order to protect the environment, but no explicit definition is given. The OECD has suggested the following as a general definition of pollution:

> "the introduction by humankind, 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 eco-systems, impair amenities or interfere with other legitimate uses of the environment."[18]

The particular features of the definition are that the pollution - the deleterious effect -has to be man-made by *adding* substances to the natural environment; that a danger is created; and that the definition is oriented to safeguarding human use and consumption of environmental resources.[19] Further, no threshold of damage is expressed. The definition expresses the cause of events with less regard to liability or restitution.

Due to the complex character of environmental damage, definitions are also suggested concerning domestic and transboundary pollution. "Domestic pollution" means "any intentional or unintentional pollution, the physical origin of which is situated wholly within the area under the national jurisdiction of one country and which has effects within that area only".[20] Transboundary pollution has been defined as:

> "any intentional or unintentional pollution whose physical origin is subject to, and situated wholly or in part within the area under, the national jurisdiction of one State and which has effects in the area under the national jurisdiction of another State."[21]

Both definitions must be read in conjunction with the general definition of pollution, since the latter definitions are more a matter of jurisdiction than of defining environmental damage.

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16 See Saunders 1976, p 2.

17 The Declaration of the UN Conference on the Environment and Development (UNCED), 31 ILM 876 (1992).

18 OECD, *Recommendation for the Implementation of a Regime of Equal Right of Access and Non-Discrimination in Relation to Transfrontier Pollution*, C(77)28(Final), adopted May 17, 1977 (hereinafter OECD 1977 Recommendation), see Annex (c). See also in OECD, *OECD and the Environment*, 1986; and in D B Magraw (ed*), International Law and Pollution*, 1991 (hereinafter Magraw 1991), p 3 and p 22 note 3.

19 Springer notes that "[i]f there is any clear consensus on any aspect of what pollution is, it is the general belief that pollution in the legal sense is necessarily caused by man, either directly or indirectly", Springer 1977, p 531 note 2.

20 OECD 1977 *Recommendation*, Annex (b).

21 OECD, 1977 *Recommendation* Annex (a). See also OECD and the Environment, 1986; also in Magraw 1991, p 4 and p 23 n 9.

As we move further into contemporary regulation, we must note that the definitions in particular instruments are expressed for the purpose of that particular instrument and concern the typical effects of the particular activity or the particular substance regulated under the objectives of the instrument. Hence, a multitude of definitions exists, apparently in line with a generational development. The program of moving from an issue-by-issue approach to a multi-media objective begins to emerge.

2 Definitions for Special Applications

2.1 The Marine Environment

The marine environment is the most addressed environmental medium and several instruments focus on pollution. An early definition provides that as marine pollution shall be considered:

> "(...) the introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as hazards to human health, harm to living resources and to marine ecosystems, damage to amenities or interference with other legitimate uses of the sea."[22]

Parallels to the general definition of pollution are striking, but a general definition of marine pollution cannot be said to have been agreed upon since another global document, the 1982 UNCLOS, suggests:

> "The introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which result *or is likely* to result in such deleterious effects as harm to the living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, *impairment of quality for use of water and reduction of amenities*."[23]

The Convention thereby includes risk of damage, as well as ecological damage, and thus takes the issue further.

Starting from the two definitions,[24] certain general trends in international regulation can be distinguished. The scope of an instrument can be the polluting situation, the type

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22 The 1974 Convention for the Prevention of Marine Pollution from Land-Based Sources, Article 1(1), replaced by Annex I to the 1992 Convention for the Protection of the Marine Environment in the North-East Atlantic (hereinafter the 1992 North-East Atlantic Convention), but the definition is retained, cf the 1992 Convention Article 1(d).

23 The 1982 UN Convention on the Law of the Sea, 21 ILM 1261 (1982) as amended 33 ILM 1309 (1994): article 1(4) (emphasis added). The origin of the definition was the work by the UN Joint Group of Experts on the Scientific Aspects of Marine Pollution, GESAMP (UN Doc A/7750, 1969). The working group decided not to alter the definition when reviewed due to the 1992 UNCED in Rio. See WHO/GESAMP, Reports and Studies, No 44, 1991, Report of the 21st Session, February 1991. The definition is also used in the 1976 Barcelona Convention for the Protection of the Mediterranean Sea.

24 Newer definitions in soft law do not alter the essence, see e.g. the 1990 ECE Code of Conduct on Accidental Pollution of Transboundary Inland Waters defining "accidental pollution" as "the introduction, directly or indirectly, of hazardous substances into transboundary inland waters as a result of incidents originating wholly or partly within the area under the jurisdiction of one country,

of pollutant, the polluting source or activity, or the affected area. International marine regulation has concentrated mainly on four sources of pollution; seabed explorative activities, land-based and vessel-based sources, and dumping and other disposal of wastes.

2.1.1 Exploration and Exploitation of the Deep Seabed

An issue involving the use of marine resources is the access to the deep seabed and the right to exploit the Continental Shelf, mainly for minerals and oil.

In addition to marine boundaries of the sea, a rather early instrument, the 1958 Geneva Convention on the Continental Shelf, regulates the boundaries of the seabed and was a first attempt to introduce a regime. The Convention establishes the exclusive right of the coastal states to explore and exploit the seabed up to a depth of 200 metres as a part of national territory.[25] If technology permits, the limit can be extended to include the Continental slope, if the seabed area is "adjacent" to the coast and if the activities do not interfere with regular uses of the waters of the sea.[26] By an interpretation of the ICJ in 1969, as an area "adjacent" to coasts could be regarded the seabed no further than 25 sea miles from the coastline.[27] Areas beyond that imagined border are parts of the commons and the resources presumably parts of "the heritage of all mankind". All exploration and exploitation should be conducted in accordance with international law; and public knowledge of scientific results is primary to that of active coastal states.[28]

Another early instrument also addresses the issue. The damaging effects of exploitation were recognized at regional level when oil resources were discovered in the North Sea. The result of negotiations between coastal states concerned was the 1977 London Convention on Civil Liability for Damage from Pollution by Oil resulting from the Research and Exploitation of Mineral Resources of the Seabed.[29] This Convention calls for protective and minimizing measures in the case of pollution and provides for compensation for damage. "Pollution damage" is defined as being caused by contamination resulting from the escape or discharge of oil.[30]

Exploration and exploitation of the seabed are further addressed in the 1982 UNCLOS, which supplements the 1958 Geneva Convention. A general provision obliges states, individually or jointly, to undertake all practicable measures necessary to prevent, reduce and control pollution of the marine environment, to control the use of

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which causes or threatens to cause significant impairment of the quality of transboundary inland waters and/or significant damage to aquatic eco-systems in an area under the jurisidiction of another country" (Article I.(b)); see also the 1990 ECE Guidelines on Responsibility and Liability Regarding Transboundary Water Pollution, Article I.1.(b). Both documents are published in H Hohmann (ed), *Basic Documents of International Environmental Law*, Vol 1, 1992.

25 Articles 1 and 2.

26 Article 4.

27 North Sea Continental Shelf Cases, the International Court of Justice Reports 1969, pp 22 and 31.

28 Article 5. Cf 1982 UNCLOS Article 76.

29 14 ILM 1450 (1977). See further A Kiss and D Shelton, *International Environmental Law*, 1991 (hereinafter Kiss and Shelton 1991), p 188.

30 See Article 1.6.

technology, and to minimize "(c) pollution from installations and devices used in exploration or exploitation of the natural resources of the seabed and subsoil...".[31]

In accordance with the 1958 Geneva Convention, other provisions of the 1982 UNCLOS distinguish between seabed under national jurisdiction and seabed as a part of the commons called "the Area". All states are obliged to protect the Area and its marine environment from harmful activities and shall adopt appropriate rules, regulations and procedures with

> "[..] particular attention being paid to the need for protection from harmful effects of such activities as drilling, dredging, excavation, disposal of waste, construction and operation or maintenance of installations, pipelines and other devices related to such activities; [..]"[32]

Coastal states are in the same manner obliged to adopt and enforce regulation of seabed activities under their jurisdiction or control.[33]

> These principles are reinforced by regional instruments, primarily the UNEP Regional Seas Conventions. UNEP has also issued recommendations, or "principles", to govern operations within the national jurisdiction. Permits are required based on impact assessments, as well as security measures, and information and consultation between states. International responsibility and compensation to victims are also established.[34]
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> Also the 1992 Baltic Sea Convention contains provisions to a similar effect.[35]

2.1.2 Land-Based Pollution

During UNCLOS I, pollution of the oceans was a major issue, although with limited scope since oil pollution, ocean dumping and land-based pollutive sources were hardly dealt with. In the 1970s, renewed attention was drawn to the issues of sea pollution, partly because of severe accidents with oil tankers such as *Torrey Canyon* creating "black tides" in 1967, and the *Amoco Cadiz* disaster (1978). Attempts to prevent further incidents are mainly regional, but two global treaties have been adopted - the 1973 Convention for the Prevention of Pollution by Ships[36] (MARPOL), and the 1982 UNCLOS. Later efforts have concentrated on establishment of additionals and supplementaries on specific issues, such as dumping and pollution from land-based sources. Today, land-based sources of pollution are recognized as the major threat to the marine environment.[37]

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31 See further the 1982 UNCLOS, article 194.

32 The 1982 UNCLOS article 145(a). See further articles 209 and 215.

33 The 1982 UNCLOS articles 208 and 214.

34 See further e.g. Kiss and Shelton 1991, p 188. On the issue of deep seabed mining, see also S Mahmoudi, *The law of deep sea-bed mining, a study of the progressive development of international law concerning the management of the polymetallic nodules of the deep sea-bed*, 1987.

35 1974 Convention on the Protection of the Marine Environment of the Baltic Sea, 13 ILM 546 (1974), as revised by the 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area, IMO LDOC.2/Circ 303, 10/8/1992; see article 12 and Annex VI.

36 12 ILM 1319 (1973).

37 See e.g. the 1992 UNCED held in Rio, Preparatory Committee 4th Session, January 1992 T5/5.01,

The diversity of sources implies that to combat this kind of pollution effectively, a global program for the entire waters of the Earth is needed. But the only global instrument so far, is a few provisions in the 1982 UNCLOS. The Convention's general provisions on the protection and preservation of the marine environment include land-based sources as a subject for state measures.[38] States are required to adopt laws and regulations to prevent, reduce and control pollution. Other necessary measures shall also be applied, all shall include the reduction of releases of toxic, harmful or noxious substances into the marine environment.[39] Action for enforcement of regulation, as well as standards established by competent international organizations, are also required.[40]

As often in environmental regulation, the most comprehensive efforts are to be found at regional level. The 1974 Paris Convention for the Prevention of Marine Pollution from Land-based Sources, was the first treaty addressing the subject.[41] According to the 1992 edition of the convention, pollution from land-based sources means pollution of the maritime area[42] from:

> "...point and diffuse sources on land from which substances or energy reach the maritime area by water, through the air, or directly from the coast. It includes sources associated with any deliberate disposal under the sea-bed made accessible from land by tunnel, pipeline or other means and sources associated with man-made structures placed, in the maritime area under the jurisdiction of a Contracting Party, other than for the purpose of offshore activities."[43]

Hence, pollution can be introduced by discharges from coastal installations, or by incineration of waste at sea, or it can be transported by rivers into the sea.

The Convention establishes that contracting states shall, individually and jointly, adopt measures to combat marine pollution, harmonize policies,[44] and punish contraventions.[45] The states undertake to eliminate pollution caused by substances listed in Part I of Annex A (the black list), and to limit pollution by less dangerous substances, listed in Part II (the grey list).[46] The regulated substances listed on the black list are those to be eliminated due to their harmfulness, such as organohalogenic compounds, mercury, cadmium, persistent synthetics, and persistent oils and hydrocarbons[47]; and the grey list contains those less noxious or more readily rendered harmless by natural

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Annex 1, A/Conf.151/PC/31/Add.1.

38 Part XII, Section 1, Article 194(3)(a).

39 Article 207.

40 Article 213.

41 The Mediterranean Sea and the Baltic Sea were excluded from the application covering the Nort-East Atlantic and part of the Arctic (Article 2), a geographical scope retained in the 1992 North-East Atlantic Convention, cf Article 1.

42 Meaning the High Seas, territorial waters and coastal waters; see further article 1(a).

43 The 1992 North-East Atlantic Convention, Article 1 (e). The position has not changed from the preceding convention from 1974, although the definition was expressed differently, cf the 1974 Convention article 3 (c) as amended by the 1986 Protocol.

44 Article 1.

45 Article 12.

46 Article 4.

47 Annex I, Part I.

processes, although they require strict control, such as non-persistent oils, arsenic, lead and substances with deleterious effects on the taste and/or smell of products derived from the marine environment for human consumption.[48]

The scope is different in the 1992 Baltic Sea Convention compared to the 1992 North-East Atlantic Convention. The former Convention permits introduction of listed substances[49] into the marine environment only if a special permit is issued by an appropriate authority.[50] If the substance is not permitted, it is forbidden. The Convention deals in part with land-based pollution. The definition is updated in a general manner in line with the 1992 North-East Atlantic Convention:

> "'Pollution from land-based sources' means pollution of the sea by point or diffuse inputs from all sources on land reaching the sea waterborne, airborne or directly from the coast. It includes pollution from any deliberate disposal under the seabed with access from land by tunnel, pipeline or other means;" [51]

The new definitions encompass *all* sources as compared to the former listings in the editions of 1974, so that agricultural sources are also included. The cause of events is clarified in that all ways of spreading pollutants are expressly included. Concerning disposals under water, however, the 1992 definitions are limited to *deliberate* disposal. No such condition was included in the 1974 edition.

Article 6 and Annex III of the 1992 Baltic Sea Convention contain goals, criteria and measures for future prevention of land-based pollution.[52] Municipal sewage shall be treated appropriately to ensure toxicological safety. Industrial wastes, waste water and cooling water from nuclear power plants shall be minimized.

> UNEP's Regional Seas Programme also includes land-based pollution in the treaty framework. But only two of these instruments contain more detailed measures in protocols to the treaties. The protocols contain essentially the same regulation as discussed above, but the lists of substances are more comprehensive and developed - in accordance with scientific advances and results.[53]

A more recently discovered form of pollution by land-based sources is the atmospheric - airborne - pollutants that harm the marine environment. Regulation of air pollution is applicable, but the issue has also been recognized in marine documents. The 1982 UNCLOS contains two provisions requiring that states shall take measures necessary to prevent, reduce and control atmospheric pollution[54]; and shall enforce national law and

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48 Annex I, Part II.

49 The listing of substances is similar to the 1992 North-East Atlantic Convention, but is more comprehensive. See Annex II.

50 Article 6(3).

51 The 1992 Baltic Sea Convention, Article 2(2).

52 The Commission (Helcom) established by the treaty has the authority to define pollution control criteria and objectives for reducing measures, and also the duty to promote cooperation among contracting parties, as well as scientific and technological research exchange (Articles 12 and 13, and Annex III).

53 See further e.g. Kiss and Shelton 1991, as supplemented 1994.

54 Article 212.

regulations, as well as international rules and standards.[55] By a protocol in 1986, this form of pollution was added to the definition of sources listed in the 1974 Paris Convention on Pollution from Land-Based Sources. It is now expressly included in the 1992 definitions as noted above, thereby included in responsibilities of contracting states. The issue was also addressed by an UNEP Expert Group in the adoption of the 1985 Montreal Guidelines on the Protection of the Marine Environment against Land-Based Pollution,[56] the basis for the 1994 Global Programme for Action for the Protection of the Marine Environment from Land-based Activities.[57]

2.1.3 Vessel-Based Pollution

That vessel-based pollution is also a major source of damage to the marine environment has been a matter of concern since the 1920s. Several international documents address the activities from which such pollution originates. These include emergencies, accidents, intentional or unintentional discharges, rinsing of tanks, releases at sea, dumping, losses of hazardous cargos or poor safety of operations at sea.[58] Pollution by oil is still the far most common cause of damage. In 1954, the first International Convention for the Prevention of Pollution of the Sea by Oil was adopted in London. This Convention introduced the concept of certain zones where oil discharges were prohibited, as first suggested at an international conference in Washington in 1926. Due to the application of the zonal concept, the Convention had to be amended in 1962, 1969 and 1971.

The next attempt to manage the issue of ocean pollution by vessels was the adoption of the framework conventions during UNCLOS I in Geneva in 1958. The provisions concerning pollution, and the 1954 International Convention for the Prevention of Pollution of the Sea by Oil, were replaced in 1973 by MARPOL and three protocols in 1978; and with the 1974 Convention for the Safety of Human Life at Sea[59] (SOLAS), addressing nuclear hazards at sea.

In direct response to the coastal oil spill catastrophes during the 1960s, especially the *Torrey Canyon* disaster in 1967, a further step was taken. The 1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties,[60] and the 1969 International Convention on Civil Liability for Oil Pollution Damage[61] (CLC), were signed in Brussels during the IMO (then IMCO) International Legal Conference on Marine Pollution Damage. The latter treaty was supplemented by the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage[62] (the IOPC Fund Convention).

Ocean pollution by vessels is addressed in the global 1982 UNCLOS. As usual, the provisions of this Convention contain the general framework. Vessel-based pollution is

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55 Article 222.

56 See the text in EPL 77 (1985), and for further review Kiss and Shelton 1991.

57 See UNEP, Rio Follow-up: Marine Environment, EPL 26/1 (1996), p.12.

58 Cf the 1982 UNCLOS, article 194(3)(b).

59 1184 United Nations Treaty Series (UNTS) 2.

60 9 ILM 25 (1970).

61 9 ILM 45 (1970), as amended 1976 and 1992.

62 11 ILM 284 (1972), as amended 1992.

listed among the sources particularly mentioned to be "minimized to the fullest possible extent", by all necessary measures to be taken by states, individually or jointly.[63] But the major global document addressing vessel-based pollution of the marine environment is the 1973 MARPOL.

The Convention has been amended several times and today the current law consists of the principal convention, three protocols (1978), five annexes with nine appendices, and 26 resolutions (1973).[64] MARPOL addresses all discharges of harmful substances, including oil, from vessels of any type. This comprehensive approach and its effects on maritime commerce and shipping industry delayed the treaty's coming into effect by a decade. It is recognized in the preamble "that deliberate, negligent or accidental release of oil and other harmful substances from ships constitutes a serious source of pollution-"; and that the scope is "to achieve the complete elimination of international pollution [..] and the minimization of accidental discharge of [such] substances". Pollution damage is indirectly defined by definitions of harmful substances and of discharges. Harmful substance is defined according to its qualities as "any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea, *and* includes any substance subject to control by the present Convention".[65] "Discharge", in relation to harmful substances or effluents containing such substances, means any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying.[66] Exclusions are made for dumping regulated by the 1972 London Convention[67]; for releases directly arising from exploration, exploitation and associated off-shore processing; and for releases part of legitimate, controlled scientific research.[68] "Incident" mean events involving the actual or probable discharge into the sea of a harmful substance, or effluents containing such a substance.[69]

MARPOL is a framework convention, the substantive provisions being found in five annexes. Each annex regulates separate types of pollutant. Annex I concerns transport of oil. All discharges into the sea are prohibited, but can be allowed under strict conditions depending on vessel type and size. If safety of the ship or life at sea are at risk, discharges may be allowed even in special protected areas such as the Mediterranean, the Baltic and the Red Sea. The Annex was amended in 1984, modifying technical regulations regarding the design of tankers, loading facilities, and so forth. Annex II regulates transport of noxious liquid in bulk and divides more than 400 substances into categories patterned in a familiar manner of black and grey lists. Category A contains substances not to be discharged because they represent major hazards to marine resources or human health, or could cause serious harm to legitimate uses of the sea. Substances listed in categories B-D may be discharged but only under

63 Article 194.

64 See Kiss and Shelton 1991, p 175.

65 Article 2 (2) (emphasis added).

66 Article 2(3)(a).

67 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 18 ILM 510 (1979).

68 Article 2(3)(b).

69 Article 2(6).

strict conditions, especially into the Baltic or the Black Sea. Annexes III-V are optional. Annex III concerns transport of harmful substances, Annex IV sewage and Annex V garbage. The provisions contain a general prohibition on discharges of sewage and plastics, especially in certain protected zones.[70]

In a regional context, the first instrument addressing pollution from ships was the 1974 Baltic Sea Convention, as replaced in 1992. The issue is regulated especially in article 8 and the comprehensive Annex IV, but also in article 5 - the general rule concerning harmful substances - and Annex I.

The regime for oil pollution liability was amended by protocols in 1992. The CLC and the IOPC Fund Convention establishes civil liability for oil pollution damage and a compensatory device if the shipowner's insurance is insufficient. Being instruments of liability, the definition is related to the damage and expressed in terms of compensable damage. The CLC provides:

> "6. "Pollution damage" means:
> (a) loss or damage caused outside the ship by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, provided that 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;"[71]

Also the costs of preventive measures and further loss or damage caused by preventive measures are included in the definition. A reference to this definition is made in the 1992 Protocol to the IOPC Fund Convention assuring consistency.[72]

Both global and regional provisions address the cases of emergency arising from marine casualties or discharges. By emergency situation is meant the presence, or the prospective presence, of oil or other harmful substances, polluting or threatening to pollute the sea, presenting a grave and imminent danger to the coast or related interests.[73] A rather new addition to the regime is the 1990 OPRC Convention,[74] in which "oil pollution incident" is defined as "an occurrence or series of occurrences having the same origin, which results or may result in a discharge of oil[75] and which poses or may pose a threat to the marine environment, or to the coastline or related interests of one or more states, and which requires emergency action or other immediate response".[76] It is noticeable that the marine environment is defined as having the same status as interests of individual states.

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70 See further about the Annexes, e.g. Kiss and Shelton 1991, pp 176-177.

71 The 1992 Protocol to the CLC, Article 2(3); published in Ds 1994:120 Ändrade regler om ansvarigheten för oljeskador till sjöss, Annex 1, p 110.

72 See the 1992 Protocol to the IOPC Fund Convention, Article 2(2); published in Ds 1994:120 Ändrade regler om ansvarigheten för oljeskador till sjöss, Annex 2, p 141.

73 Cf the 1983 Bonn Agreement for Cooperation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, article 1.

74 International Convention on Oil Pollution Preparedness, Response and Cooperation, 30 ILM 733 (1991).

75 "Oil" includes crude oil, fuel oil, sludge, oil refuse and refined products. Article 2(1).

76 Article 2(2). See also the definition in the 1989 Salvage Convention Article 1.(d): "Damage to the environment means substantial physical damage to human health or to marine life or resources in coastal or inland waters or areas adjacent thereto, caused by pollution, contamination, fire, explosion

2.1.4 Pollution by Dumping and Incineration of Waste at Sea[77]

Dumping and incineration of waste at sea constitutes the fourth regulated source of pollution.

The first international instrument addressing dumping at sea was the global 1972 London Convention. The objectives of the treaty are to control and prevent marine pollution caused by:

> "dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea".[78]

Dumping is defined as:

> "(i) any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;
> (ii) any deliberate disposal at sea of vessels, aircraft, platforms or other man-made structures at sea;"[79]

but does not include:

> "(i) the disposal at sea of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures;
> (ii) placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this convention;"[80]

Also excluded is the disposal of wastes or other matter directly arising from, or related to the exploration, exploitation and associated off-shore processing of seabed mineral resources.[81] Only deliberate activity is encompassed by the definition. Waste itself is not defined, just identified as material and substance of any kind, form or description.[82]

According to article IV, dumping of substances listed in Annex I (the black list) is prohibited; and a special permit is required for substances listed in Annex II (the grey list). Dumping of all other wastes or matter is permitted under a prior general permit.[83]

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or similar major incidents".

77 Concerning dumping of radioactive waste, see the 1958 Convention on the High Seas, Article 25(1); the 1972 London Convention Annex I(6); the 1992 Baltic Sea Convention Annex V; the 1976 Protocol to the Barcelona Convention Article IV and Annex I No 7; and further recommendations and guidelines issued by IAEA, OECD and the European Nuclear Energy Agency (ENEA).

78 Article I.

79 Article III (1) (a).

80 Article III (1) (b).

81 Article III(1)(c).

82 Article III(4).

83 The scope will be altered once the 1996 Protocol comes into force. Article 4 of the Protocol states

Excluded from the Convention is dumping in emergency situations, provided dumping appears to be the only way of averting the threat to safety of human life or of vessels; or in other force majeure situations.[84] Vessels and aircraft entitled to sovereign immunity under international law are also excluded from application of the convention.

In the 1982 UNCLOS, dumping is defined in much the same way.[85] Other provisions declare that states shall adopt national laws and regulations; undertake measures; and establish global and regional rules for the purpose of prevention, reduction and control of this type of pollution.[86]

As provided in the 1972 London Convention, Article VIII, there are also regional documents addressing this type of pollution. One of these was actually adopted earlier, the 1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft, now being revised in 1992.[87]

> One incident promoting the adoption of the Oslo treaty was the *Stella Maris* affair. In 1970, Scandinavian scientists proved the presence in seawater of aliphatic chlorinated hydrocarbons (ACH) used in manufacture of the plastic PVC (polyvinyl chloride). The toxics are particularly dangerous through their persistency. In 1971, the Dutch tanker *Stella Maris* was loaded with 650 tonnes of ACH that in accordance with the contract were to be dumped in the northern part of the Dutch part of the continental shelf. Due to Norwegian protests, the shipping company voluntarily rescheduled the dumping to take place at a point in the Atlantic between the Icelandic and Irish coasts. But new protests forced the ship to return to Rotterdam and the lethal cargo was unloaded and later taken care of by a Belgian firm. The Norwegian Government expressed its concern at the increased dumping at sea and concluded bilateral bans on the dumping of persistent and harmful substances. A conference was held in October 1971 in Oslo and the convention was adopted.[88]

Although the geographical scope is different, the two Conventions - the 1972 London and the 1972 Oslo Dumping/1992 North-East Atlantic Convention Annex II - are in all essential aspects similar.

The 1992 Baltic Sea Convention applies a different system in that all dumping is forbidden, with exceptions under special prior permits specified in Annex V. The definitions are almost identical to those of the 1972 London Convention.

> The 1972 London Convention also set the pattern for UNEP Regional Seas Conventions. The main difference is the contents of black and grey lists, according to achievements in scientific research.

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that dumping of any waste shall be prohibited with the exception of those listed in Annex 1 to the Protocol. See also IMO News, No 4 1996, p. 29.

84 Article V. See also IMO, *Article V of the London Convention 1972: Interpretation of the force majeure and emergencies exceptions*, EPL 25/3 (1995) p 141 et seq.

85 See Article 1(5).

86 Article 210. The coastal state is given the principal jurisdiction of enforcement within its territorial sea, EEZ and continental shelf. The flag state is the principal with regard to vessels and aircraft registered or flying the flag. Any state can enforce regulations with regard to acts of loading within its territory or at its off-shore terminals, see Article 216.

87 11 ILM 262 (1972), revised by the 1992 North-East Atlantic Convention, Annex II.

88 See also K A Gourlay, *Poisoners of the Seas*, 1988, pp 16-19.

Another form of waste disposal at sea is incineration on board ships. This generates atmospheric pollution of the marine environment by transporting pollutants by air. Amendments in 1993 to the 1972 London Convention prohibits incineration at sea of industrial waste and sewage sludge.[89] Concerning regional documents, a fourth annex concerning incineration was added to the 1972 Oslo Dumping Convention by a protocol in 1983. Incineration is defined as any deliberate combustion of substances and materials at sea for the purpose of their thermal destruction.[90]

Incineration should be regarded as a temporary solution and all practical alternatives should be considered before the prior authorization requested is issued. A fixed date for ending this form of waste disposal is required by the protocol, and in the meantime, all facilities should be regularly inspected.

The 1992 Baltic Sea Convention prohibits incineration.[91]

A further instrument is the 1989 Basel Convention.[92] In comparison to the 1972 London Convention, the 1989 Basel Convention is limited to *hazardous* waste and fewer materials are listed because of different criteria. Above all, the scope is different. The 1972 London Convention is concerned with disposal of waste at sea. The 1989 Basel Convention aims at reducing the generation of hazardous waste under a "from-cradle-to-grave" objective, and further at reducing transfer under a "closest-to-source" policy.[93]

2.1.5 Inland Waters

Pollution of inland waters has been defined as:

> "any detrimental alteration in the composition or quality of the waters of an international watercourse which results directly or indirectly from human conduct".[94]

If such damage occurs, all watercourse states have a duty of non-discrimination of access to justice. The 1974 Nordic Convention for the Protection of the Environment[95] is referred to in this respect by the ILC.[96] Unfortunately, no requirement of a *right* to compensation or other relief is included. The watercourse states should – in case of significant harm – consult over ad hoc adjustments and "where appropriate" over the question of compensation. [97]

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89 Cf. IMO News, No 4 1996, p. 30.

90 Article 1(b). See also the 1992 North-East Atlantic Convention, Annex II.

91 See further Article 10 and Annex IV. The definition of incineration is expressed in a similar fashion as the 1983 Protocol to the 1972 Oslo Dumping Convention, see Article 2(5).

92 Convention on the Control of Transboundary Movements of Hazardous Waste, 28 ILM 657 (1989).

93 See further IMO, *Transboundary Transport of Hazardous Waste*, 12th Consultative Meeting, LDC 12/INF.7, 5 October 1989. Export of waste will be prohibitited by the 1972 London Convention through the 1996 Protocol (Article 6).

94 See the draft ICL Convention on the Law of the Non-navigational Uses of International Watercourses, Article 21 (1), EPL 27/3 (1997), p. 235.

95 13 ILM 591 (1974).

96 Draft article 32.

97 Draft article 7 (2).

2.2 Air and the Atmosphere

Concerning air pollution, the issue needs a different approach. Air pollution differs from marine pollution in that it spreads faster and further during a shorter period of time. The substance released need not be harmful per se, it may well be transformed by chemical processes to become harmful to e.g. the ozone layer.

The general definition of air pollution is provided by the 1979 LRTAP:[98]

> ”(a) “air pollution” means 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, material property and impair or interfere with amenities and other legitimate uses of the environment, and “air pollutants” shall be construed accordingly,”[99]

The similarity to the general definitions of pollution and concerning marine pollution is striking. All three were expressed during the same period, the 1970s.

With the objective of regulating transboundary pollution, a clause on jurisdiction is included:

> “(b) “long-range transboundary air pollution” means 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 distuingish the contribution of individual emmissions sources or groups of sources.”[100]

The definition aims at addressing the most difficult issue in air pollution, the possibility to demonstrate the source and to prove causality.

The scope of definitions concerning protection of the ozone layer differs while primarily focusing on ecological changes. The first instrument, adopted at the time of the discovery of the ozone hole over Antarctica, was the 1985 Vienna Convention for the Protection of the Ozone Layer.[101] The objective of the Convention is to protect human health and the environment against adverse effects resulting from modifications of the ozone layer.[102] In accordance, the following definition is provided:

> “2. “Adverse effects” means changes in the physical environment or biota, including changes in climate, which have significant deleterious effects on human health or on the composition, resilience and productivity of natural and managed ecosystems, or on materials useful to mankind.”[103]

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98 Convention on Long-Range Transboundary Air Pollution, 18 ILM 1442 (1979).

99 Article 1(a).

100 The 1979 LRTAP, Article 1(b).

101 26 ILM 1529 (1987).

102 For the purposes of the Convention, defined as “the layer of atmospheric ozone above the planetary boundary layer”, Article 1(1).

103 Article 1(2).

The essence of the definition is repeated in the 1992 Framework Convention on Climate Change[104]:

> "'Adverse effects of climate change' means changes in the physical environment or biota resulting from climate change[105] which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare".[106]

The two latter definitions contain a threshold of damage. The effect must have *significant* deleterious effects otherwise not included under the regimes of the Conventions according to the definitions.

3 "Multi-media"[107] Definitions

Contemporary definitions tend to be more general, addressing the whole environment (multi-media approach), and focus more on ecological effects than on harm causing reduced uses of environmental resources for mankind.[108] One example is the 1992 Helsinki Transboundary Watercourses Convention.[109] The Convention aims at prevention, control and reduction of transboundary impacts, especially water pollution, to ensure that transboundary waters are used in a reasonable and equitable way. "Transboundary impact" is defined as:

> "any significant adverse *effect* on the environment resulting from a change in the conditions of transboundary waters *caused by* a human activity, the physical origin of which is situated wholly or in part within an area under the jurisdiction of a Party, within an area under the jurisdiction of another Party. Such effects on the environment *include* effects on human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors, they *also* include effects on the cultural heritage or socio-economic conditions resulting from alterations to those factors;"[110]

In addition, the definition contains a threshold for damage specifying *significant* adverse effects. Further, not only *natural* environment is included in the scope, but the *man-made* environment in Salter's distinctions reviewed above is also encompassed, meaning monuments and the cultural heritage. Further, the findings of the 1987

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104 31 ILM 849 (1992).

105 In turn defined as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (Article I.1.2).

106 Article I.1.1.

107 This term is usually used with reference to new information technology, here bearing in mind the approach of non-categorization and the non-exhaustive application of instruments.

108 But already Springer noted the then emerging use of a "combination of approaches", *Springer* 1977, p 552.

109 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 31 ILM 1312 (1992). For one early example of the same technique, see the 1974 Nordic Convention for the Protection of the Environment, Article 1.

110 Article 1(2) (emphasis added).

Brundtland Commission are to some extent included. Socio-economic factors - or the *human* environment in Salter's catalogue (economic health) - are included in order to be protected from adverse effects.
This broad new type of definition is also expressed in the 1991 Espoo Convention.[111] This instrument has the same objective as the 1992 Helsinki Transboundary Waters Convention - to prevent, reduce and control significant adverse impacts.[112] "Impact" is defined in almost identical language:

> "*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 factors,"[113]

The definitions are deliberately broad as they are non-exhaustive, while *including* factors of what constitutes the environment. The feature of "man-made" effects is retained, although not in relation to "uses" of environmental values. The latter definition is noteworthy addressing as it does "any" effect without qualification, but in an instrument based on the precautionary principle such scope is self-evident.

A new regional instrument addressing the topic of definitions is the EC IPPC Directive.[114] With the aim of protecting the "environment as a whole", the specific term "environment" is not defined. The particular sectors of "air, water and land"..."taking into account waste management", are mentioned in the preamble though and, further, that the Directive shall apply "without prejudice to Community provisions on health and safety at the workplace".[115]

The term "pollution" is defined in a rather casuistic manner:

> "pollution shall mean the direct or indirect *introduction* as a result of *human activity*, of substances,[116] vibrations, heat or noise *into* the air, water or land which may be *harmful* to human health or the quality of the environment, *result* in damage to material property, or *impair* or interfere with amenities and other legitimate uses of the environment."[117]

A further definition provides that the term "emission" shall mean the "direct or indirect *release* of substances, vibrations, heat or noise *from* individual or diffuse sources in the installation *into* the air, water or land".[118] The definitions thus express the general notion of human introduction of harmful effects. The definition of "pollution"

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111 Convention on Environmental Impact Assessments in Transboundary Contexts, 30 ILM 800 (1991).

112 Article 2(1).

113 Article 1(vii), (emphasis added).

114 Council Directive 96/61 concerning integrated pollution prevention and control, OJ L 257, 10/10/1996, p 26.

115 Dir 96/61, paras 8, 15 and 29 of the preamble.

116 In turn defined as "any chemical element and its compounds, with the exception of radioactive substances [...] and genetically modified organisms [...]", see Article 2.1.

117 Article 2.2 (emphasis added).

118 Article 2.5 (emphasis added).

apparently encompasses the environment as a whole, while the term "emission" has restricted application to the sectors of air, water or land. On the other hand, "pollution" is under qualifications concerning its consequences; could be the result of "emissions"; and entails the concept of risk according to the definition.[119]

A further example from regional level is the 1993 COE Convention[120] which expresses the following definition of the "environment":

> "'Environment' includes
> - natural resources both abiotic and biotic, such as air, water, soil, fauna and flora and the interaction between the same factors;
> - property which forms part of the cultural heritage; and
> - the characteristic aspects of the landscape."[121]

Items of the natural and the man-made environment are included, but not items of the human environment. The definition is not exhaustive though.[122] Being an instrument of liability, the damage to the environment is expressed in the 1993 COE Convention in terms of compensable damage.[123]

In the response to the 1993 EC Green Paper,[124] ECOSOC expressed that the anticipated instrument on civil liability should define the environment in broad terms. The 1993 COE Convention was mentioned as an example. Concerning the definition of environmental damage, ECOSOC recommended that the legal definition should cover all physical, chemical or biological deterioration of the environment, graded according to type of damage, effect (cf temporal character above), and site value, including natural, man-made and human environmental factors.[125]

Finally, a new source of pollution is now being addressed. Natural catastrophes such as earthquakes and hurricanes may contribute as triggers of technical hazards (so called na-tech).[126] The results of current discussion will perhaps eventually alter definitions of force majeure, at first sight a problem for insurers.

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119 Krämer argues that "Community law [...] proceeds on the basis that emissions [...] are legally permitted so long as there is no prejudice [...]. Therefore not every emission constitutes a pollution. [I]f a person making emissions remains within the limits laid down, the question of "pollution" does not immediately arise", see L Krämer, *Focus on European Environmental Law*, 1992, p 248.

120 Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, 32 ILM 1228 (1993), also called the Lugano Convention.

121 Article 2(10).

122 In a subsequent convention by the Council of Europe, the essence of the definition is retained but with an addition of the feature "human environment". The environment is defined to mean "(i) natural resources both abiotic and biotic, such as air, outer space, water, soil, climate, fauna and flora and the interaction between the same factors; (ii) assets which form part of the man-built environment; (iii) the characteristic aspects of the landscape; (iv) quality of life and conditions to the extent that they have, or are likely to have, an influence on the welfare and health of human beings", see the 1994 Council of Europe Model Act on the Protection of the Environment, Dela/Model Act (94)1, article 1(b).

123 See Article 2(7).

124 Communication from the Commission, *Green Paper on Remedying Environmental Damage*, COM (93)47.

125 See the Communication from ECOSOC, *Green Paper on Remedying Environmental Damage*, OJ C 133/8, 16/5/1994, p 11.

126 See e.g. P S Showalter and M F Myers, *Natural Disasters in the United States as the Release Agent*

4 Conclusion

In sum, environmental damage is of a complex character. The damage appears in a national, regional (transboundary) or global setting, and is manifest as accidental, gradual or historic damage.

As reviewed, numerous *sources* exist, ranging from fixed (immovable) installations, movable sources, products/chemicals to waste and energy. To this should be added multiple and synergetic sources. The traditional approach, with its origin in nuisance law, is to list the sources to be included. An alternative method is to concentrate on the effects and list the sources in a broad manner (residual, including waste; accidental; chemicals; and so forth). Identification of sources and knowledge of their interactions depend on scientific results and technological achievements, but as concluded at the 1992 UNCED, this is not a reason to 'sit and wait'. A common core of definitions of pollution damage is that the pollutant is released (man-made) 'in the wrong place', negatively affecting an environmental medium (air, water or soil), and further causing damage to the environment, property interests or living conditions. This constitutes, according to traditional environmental tort law, indirect damage to economic interests.

The tendency is clearly a broadening of the definitions in line with integrated and multi-media approaches in environmental law, occasionally including values to be protected, such as environmental media, living organisms supported by them (man and nature), cultural heritage, and so forth. While defining the "environment" as including natural, man-made and human elements, the definitions of "pollution", "impact" and "adverse effects", and further compensable damage, are used to specify the scope of the instruments. Primarily the threshold of significant damage limits the usefulness in a perspective to achieve restitution. Not *all* damage is included. It is not regarded as necessary, or economically possible, to express in reparative schemes an all-encompassing definition of either the environment or pollution.[127] The instruments must further provide for a flexible interpretation since not all features are yet known and science is still making new discoveries. The definition of damage depends naturally on the results of the natural sciences.

The definitions are further dependent on the *objective* of the instrument. As the character of the issues has changed, so have the definitions. With a first generation of definitions focusing on activities with adverse effects on the quality of the environment, thereby minimizing the usefulness of the resource to man, a second generation combines in the definitions the human approach with an ecological one. Although it is tempting to pronounce a new ecological trend, the alteration in definitions might well be due to differing objectives among these recent instruments. Application is not limited to one single activity with a definite environmental effect. Instead, a broad application necessitates a broad and general definition. An example of the need of such definitions is the statement by Saunders that in most cases acute, and some chronic, forms of pollution "seem to be declining", and that in the future damage is expected in the form of "wide-spread sub-lethal responses to chronic, very low-level pollution", very "localised severe responses to limited acute pollution arising from accidents" and "poor

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of Oil, Chemicals or Radiological Materials Between 1980-1989: Analysis and Recommendations, Risk Analysis 14(2), 1994, pp 169-182.

127 Cf the interpretation of the polluter pays principle in e.g. OECD/GD (92)81, *The Polluter Pays Principle*, Environment Directorate, 1992.

waste disposal techniques".[128] Such a development of the character of pollution necessitates a dynamic legal approach.

Contemporary definitions enumerate some factors of the environment as *included* under the scope of the instrument. With this technique, open-ended definitions are suitable for dynamic interpretation. But whether the operation of the definitions also generates a different emphasis in practice remains to be seen.

128 See Saunders 1976, p 29.