

Blind fear, that seeing reason leads, finds safer footing
than blind reason stumbling without fear:
to fear the worst oft cures the worse.
– William Shakespeare (1564-1616)

5. THIRD LEG OF THE TRIPOD: ACTION

5.1. *Action*

In the previous two chapters the first and the second leg of the precautionary tripod have been examined. Just as Apollo's tripod would not have supported the Pythia with only two legs, the precautionary principle would be utterly meaningless without its third ingredient, the element of action. As discussed above, it is incorporated as a core element in virtually every definition of the principle, whether in legal instruments or literature.¹ To illustrate this point it suffices to call to mind that a generally accepted synonym of the precautionary principle is “the principle of precautionary *action*”.²

Some Observations on the Right and the Duty to Take Precautionary Action

As for the normative quality of the precautionary principle in general international law, it has become clear in the previous two chapters that, where there are reasonable grounds for concern that significant environmental harm may ensue, states are deemed to have a customary *right* to do something about it. Where, however, the anticipated harm is not only significant but also serious or irreversible, states must be considered to also have an *obligation* to take action.³ Hence, when the right conditions are met, precautionary action is not merely optional. In the words of the EU Court of Justice, under the precautionary principle “a public authority may be *required* to take action even before adverse effects have become apparent.”⁴ It is warranted to briefly contemplate this mandatory feature of precautionary action.

First and foremost, it is reflected in the majority of formulations of the precautionary principle that occur in international and national legal and

¹ See *supra* paragraph 2.3.

² See, e.g., the PARCOM *Recommendation 89/1 on the Principle of Precautionary Action*; Sands, 1994/1996, p. 22.

³ See, especially, *supra* paragraphs 3.3 and 4.3.

⁴ *Alpharma*, Case T-70/99, Judgment of 11 September 2002, paragraph 355; italics added. Also in the ITLOS *Land Reclamation* case, both Malaysia and Singapore agreed on this point; see the *Verbatim Records* of the sittings on 25 (p. 20, Schrijver for Malaysia) and 27 September 2003 (p. 32, Reisman for Singapore).

policy instruments and judicial proceedings. Almost invariably these are phrased in a compulsory fashion. When it comes to acting in a precautionary manner use is made of the words ‘shall’, ‘will’, ‘must’, ‘should’ and ‘ought to’, rather than ‘may’ and the like.⁵ Second, the scholarly record mirrors this predominance. Representative of the academic majority viewpoint is, for instance, the observation by Matthee and Vermersch that the precautionary principle “allows and even obliges” governments to adopt measures if and when “a reasonable fear for irreversible or serious damage exists.”⁶

Not always is it easy to strike a proper balance between the parallel goals of writing concisely and writing clearly. It is submitted in this respect that for present purposes at least, it is best to err on the side of clarity. At the risk of stating the obvious, therefore, a feature of Principle 15 of the *Rio Declaration* and similarly drafted provisions will be briefly dwelt upon here that might seem self-evident to many, but maybe not all readers. When it is stipulated that scientific uncertainty shall not be used as a reason for ‘postponing’ measures to protect the environment, this prohibition logically comprises the situation where measures are not merely delayed but just not taken at all. The French *Code Rural*, for example, sets out that the absence of certainty “ought not to delay”

⁵ Out of all provisions of legal instruments reviewed in Trouwborst, 2002, only Article 5(7) of the *SPS Agreement* contains permissive instead of obligatory language. See also Matthee & Vermersch, 2000, p. 66.

⁶ Matthee & Vermersch, *ibid.*, p. 60; see also at pp. 61 and 66. Other examples are the consensus among the participants to the 2000 Lauterpacht International Law Centre workshop on “The Precautionary Principle in Wildlife Conservation” (see Cooney, 2000), that “an obligation on decision-makers” is a “fundamental element” of the principle; DeFur & Kaszuba, 2002, p. 157, speaking of “the duty to act” as one of three basic elements of precaution; Borgers, 1999, p. 435, describing the duty to take protective measures as the core of the precautionary principle; Ebbesson, 1996, at pp. 119-120, similarly stating that “[t]he core is the understanding that precautionary measures *must* be taken” when there is reason to assume..., etc. (emphasis added); Canelas de Castro, 1999, p. 199, note 155, according to whom the principle “*demand*s actions to prevent environmental degradation” (emphasis added); Cameron & Abouchar, 1996, p. 45, asserting that once relevant thresholds are crossed, there is “a positive obligation to terminate the harm” and that under these circumstances “regulatory inaction is unjustified”; Nollkaemper, 1996, p. 75, stating that, given fulfilment of conditions for the triggering of the precautionary principle, “prevention is mandatory”; the similar submission of Lemons *et al.*, 1997, p. 210, that the principle “requires” the adoption of preventive measures; Birnie & Boyle, 2002, p. 117, speaking of a “legal responsibility to act”; Hey, 1992, p. 305, stating that the principle “requires” that policy-makers adopt an approach ensuring that errors are made on the side of excess environmental protection; Marr, 2003, p. 79, speaking of an “obligation” to take the principle into account “as a legal principle”; Martin, 1997, p. 266, lining up various definitions all of which acknowledge the imperative nature of harm prevention; and Sands, 1995(a), p. 212. A permissively phrased version of the principle can be found in Federale Raad voor Duurzame Ontwikkeling, 2001, p. 18, where it is stated that in name of the precautionary principle measures *can* be taken.

the adoption of measures aimed at preventing environmental damage.⁷ By outlawing the *delay* of preventive action, the suitability of taking such action in the first place is considered a given. Hence, what this provision and others like it amount to is simply an obligation to take action⁸ – subject, of course, to any specified threshold conditions – while indicating the appropriate moment in time for taking it. Several instruments, evidently to avoid misunderstanding, even state this explicitly (thus suggesting that the balance struck in the present paragraph between conciseness and clarity is perhaps not such an outlandish one⁹). According to the 2001 *South-East Atlantic Fisheries Convention*, to name one, the absence of adequate scientific information shall not be used “as a reason for postponing *or failing to take* conservation and management measures.”¹⁰ The first of the 2002 *Guiding Principles on Invasive Alien Species*, to name another, is of similar purport:

The precautionary approach should also be applied when considering eradication, containment and control measures in relation to alien species that have become established. Lack of scientific certainty about the various implications of an invasion should not be used as a reason for postponing *or failing to take* appropriate eradication, containment and control measures.¹¹

Resuming, in accordance with Principle 15 of the *Rio Declaration* and similar provisions, action to protect the environment must be taken and uncertainty may not be used as an excuse for not doing so or delaying it. It may seem that, strictly speaking, the triple negative of Principle 15 and the such is without prejudice for the use of other reasons, not related to uncertainty, for postponing or failing to take precautionary action, such as social or economic motives.¹² This is an issue that will be addressed further on in this study.¹³

Not only the duty to take precautionary measures, but also the right of states to do so merits a closer look before moving on. This right applies in situations where there are reasonable grounds for concern that significant

⁷ Article 200(1) of the *Loi Barnier* of 2 February 1995; translation from De Sadeleer, 2000, p. 148.

⁸ Or, in the words of one writer, a prohibition on abstaining from action: Giraud, C., “Le Droit et le Principe de Précaution: Leçons d’Australie”, in: *Revue Juridique de l’Environnement*, No. 1, 1997, as referred to in Matthee, 2001, at p. 184.

⁹ Heukers, 1997, at p. 24, also found it worthwhile to expressly include this explanation.

¹⁰ Article 7(2); author’s emphasis.

¹¹ Second half of Guiding Principle 1; author’s emphasis. For other provisions like this see Articles 10(6) and 11(8) of the *Biosafety Protocol*; Principles 6.5 and 7.5.1 of the *FAO Code of Conduct for Responsible Fisheries*; Article 6(2) of the *Straddling Stocks Agreement*; Article IV(2) of the 2003 *Antigua Convention*; and Section 10(d) of the 1996 *New Zealand Fisheries Act*; on the latter, see Mascher, 1997, pp. 77-78.

¹² Bodansky, 2004, p. 384.

¹³ See *infra* Chapter 9.

environmental harm may come about. One may wonder whether this right is a novel phenomenon at all. Was precautionary action to avoid significant damage not always allowed?¹⁴ As a matter pertaining to the sovereign entitlement of states to do within their territories what they please as long as they do not interfere with the rights of other states, it arguably was. Moreover, as documented elsewhere, implicit precaution has been a common element of state practice for a long time.¹⁵ This is not the same, however, as saying that a fully-fledged international legal right to take precautionary action, of the kind that can compete with the legal privileges of other states – and the precautionary right will be especially relevant in cases of conflicting rules¹⁶ – has always existed in public international law. That assertion is not made here. The present study has done no more and no less than to confirm the existence of such a fully-fledged right in *contemporary* international law and to partially define its extent. It is in any case submitted that the *obligation* to take precautionary action when particular, more stringent threshold conditions are fulfilled is a feature of comparatively recent origin. Only of late have states begun to exercise precaution out of a sense of duty.¹⁷

The following three paragraphs of this chapter will be concerned with the *where*, *when* and *how* of precautionary action. Where, i.e., in what areas of the world and to what environmental sectors does the precautionary principle find application? When precisely is action called for, i.e., when are thresholds crossed? And how, finally, is one to determine what action to take?

5.2. *Where?* – *The Reach of the Precautionary Principle*

Delphi, to stick with the Apollonian analogy, marked the navel of the world. When Zeus released two eagles, one from the west and one from the east, they met at Delphi. Apollo's gaze reached everywhere and his powers were very comprehensive. His lyre music charmed "the gods, the wild beasts, and even the stones." Whether the precautionary principle is to be considered the navel of international environmental law remains to be seen, although a thing or two

¹⁴ Several scholars seem to suggest just this when asserting that "the concept of precaution can only present some specificity with respect to classical prevention if it consists in an obligation, and not solely a right to act in a situation of uncertainty." Hancher, 1996, p. 199, referring to Cameron, J. & Werksman, J.D., *The Precautionary Principle: A Policy for Action in the Face of Uncertainty*, 1991.

¹⁵ See Trouwborst, 2002, pp. 20-24 and *passim*.

¹⁶ On potential conflicts between the precautionary principle and the freedom of navigation see Marr, 2003, pp. 41-45 and 184-201; on the relationship between the principle and international trade law see, e.g., De Sadeleer, 2002, pp. 341-365; Cordonier-Segger & Gehring, 2003, *passim*; Matthee & Vermersch, 2000, *passim*.

¹⁷ Trouwborst, 2002, pp. 276-278.

could be said in favour of this position.¹⁸ In any case, with the powers of Apollo the principle has in common that its reach is apparently very wide indeed. How wide exactly is the subject matter of this paragraph.

It was already established above that the reach of the precautionary principle encompasses all types of uncertainty, regardless the classification used. To summarize, the principle covers cases of epistemological and ontological uncertainty alike, and applies equally to quantifiable risks, uncertainty proper and ignorance.¹⁹ This paragraph concerns a different dimension of the principle's scope. For present purposes the enquiry 'where?' is made up of at least four component questions concerning the application of the precautionary principle, which will be treated consecutively:

- (1) To what states;
- (2) to what geographic areas;
- (3) to what environmental issue areas; and
- (4) to what plans, activities, products and technologies does the principle apply?

To divergent degrees some of these questions have been dealt with elsewhere.²⁰ Revisiting them in the present context is nevertheless befitting for the purpose of this study, namely to provide a picture of international legal rights and duties associated with the precautionary principle that is both as complete and as surveyable as possible.

The answer to the first question is threefold and relatively straightforward. As a general principle of international environmental law, the principle applies to all states.²¹ As a treaty provision, it applies to the states that have expressed their consent to be bound by the treaties involved.²² Finally, as part of the fabric of general customary international law, it applies to all states except those which have from the outset persistently objected to its application.²³

The second, third and fourth questions have in common that the starting point for answering them is one and the same. That is to say, in all three cases significant clues can be encountered in the broadly accepted formulation of the precautionary principle that has been laid down, among other instruments, in the *Rio Declaration*, and in the fact that an important goal

¹⁸ Pieterman & Hanekamp, 2002, p. 46, for instance, have dubbed the precautionary principle "the legal core of [international] environmental policy".

¹⁹ See *supra* paragraph 4.1.

²⁰ Trouwborst, 2002, see relevant footnotes below.

²¹ *Ibid.*, pp. 34-35.

²² *Ibid.*, pp. 34, 63-112 and Annex A.

²³ See *supra* paragraph 1.2.

of the precautionary principle is the achievement of sustainable development through protection of the environment.

What Geographic Areas?

The first sentence of Principle 15 of the *Rio Declaration* states: “*In order to protect the environment, the precautionary approach shall be widely applied by States [..]*”²⁴ It does not read “the environment of other states or of areas beyond the limits of national jurisdiction”, as do, for instance, Principle 2 of the same Declaration and Principle 21 of the *Stockholm Declaration*.²⁵ The latter provisions in a way represent the traditional approach of public international law with its predominant focus on the demarcation of the respective competences of states and the duty not to interfere in the affairs of other states. In the environmental, as in other fields such as human rights this approach is gradually giving way to a focus on global cooperation in order to safeguard collective interests. In international environmental agreements a growing awareness can be detected that states should assume responsibility “not only in relation to other states but also in relation to nature itself,”²⁶ a trend which is driven by the contemporary insight, discussed in the previous chapter, that everything in nature is interrelated and interdependent.²⁷ Accordingly, as Kiss and Shelton explain:

The need to protect the entire biosphere implies that international rules should safeguard the environment within states, even when harmful activities produce no obvious detrimental effects outside the acting state. It also must guarantee protection to areas that are outside territorial control, including the high seas and deep sea bed, the atmosphere of the commons, Antarctica, outer space, the moon, and other celestial bodies.²⁸

Just like the wider concept of sustainable development, the precautionary principle is a prominent representative of this modern approach by aiming for the protection of the environment as a whole.²⁹ It reflects the

²⁴ Emphasis added.

²⁵ See, e.g., Trouwborst, 2002, p. 35.

²⁶ Tinker, 1996, p. 58.

²⁷ See *supra* paragraph 4.1.

²⁸ Kiss & Shelton, 2000, p. 247. In the words of Lefeber, 1996, p. 126: “it is increasingly emphasized that the preservation of the environment, irrespective of whether it concerns the environment beyond or within the limits of national jurisdiction, is a collective interest, because all ecosystems are interrelated. Obviously, the legal protection of such a collective interest can only be achieved by an obligation pursuant to which all states must prevent and abate all environmental interference which is capable of causing significant harm irrespective of the fact whether such interference has a transboundary impact or not.” Footnotes omitted.

²⁹ In the words of Birnie & Boyle, 2002, p. 104: “Like sustainable development, the precautionary approach is not limited to global environmental concerns, but encompasses in

understanding that it is not appropriate to speak of ‘the environment of other states’ since there is really only one, indivisible, global environment, which is all too fragile. In legal terms, therefore, the ambit of the precautionary principle is not confined to threats of transboundary harm.³⁰ Instead, the principle applies to threats of harm to *the environment*, wherever. If this were different, i.e., if states were to avoid transboundary harm only and would be permitted to pillage the environment within their borders at will, the preservation and sustainable development of the world’s natural resources and acceptable environmental conditions for present and future generations of human beings could never be warranted.³¹

As it is, the precautionary principle *is* being applied by states to the environment within the limits of national jurisdiction as much as outside them. Examples abound of its application in domestic laws and policies for the sake of environmental protection within the national territory, whether or not the threats in question entail potential transboundary consequences.³² Moreover, plenty instruments of general scope besides Principle 15 of the *Rio Declaration* affirm the precautionary principle’s unconditional applicability to the environment as a whole.³³ Further testimony to this broad coverage are the extensive geographic ranges – some global, some regional – of the environmental agreements and ‘soft law’ instruments in which the precautionary principle has been incorporated.³⁴ Many of these instruments have express legal implications not only for interstate issues, but also for areas beyond territorial control and for the national territories of the states involved. Instances are, to mention just a few, the *Biodiversity Convention* and several side agreements to the *Bonn Convention*,³⁵ covering biodiversity and migratory species protection outside and within states; treaties concerned with the protection of the ecosystems of rivers such as the Danube,³⁶ Rhine,³⁷ Meuse and Scheldt,³⁸ equally combining the transboundary and the

addition both transboundary and domestic environmental harm.” As Perrez, 2000, puts it at p. 249, “the acceptance of new environmental principles like the principle of sustainability or the precautionary principle is an illustration of the recognition of global common interests and the resulting transformation of the neighborly into a global approach.”

³⁰ Handl, 1991, p. 78; Sands, 1995(a), pp. 194-195; Sands, 1995(b), p. 65; Birnie & Boyle, *ibid.*, p. 117; Trouwborst, 2002, p. 284.

³¹ Trouwborst, *ibid.*

³² *Ibid.*, pp. 178-244 and 283.

³³ See the enumeration in *ibid.*, p. 283.

³⁴ For one overview, see *ibid.*, pp. 109-110.

³⁵ E.g., the 1995 *African-Eurasian Waterbirds Agreement*, the 1996 *ACCOBAMS* and the 2000 *Great Bustard Memorandum of Understanding*

³⁶ 1994 *Danube River Convention*.

³⁷ 1999 *Rhine Convention*.

³⁸ 1994 *Meuse and Scheldt Conventions*.

domestic; the treaty regimes for the Baltic and Mediterranean Seas, which cover high seas, exclusive economic zones, territorial seas, internal waters and coastal land areas of states parties;³⁹ the *Climate Change Convention*; and a great number of fisheries treaties covering maritime zones around the globe. In one of the latter, the 1995 *Straddling Stocks Agreement*, the provisions on the precautionary principle are among the few provisions that are explicitly declared to apply also to areas under national jurisdiction.⁴⁰

In summary, then, the precautionary principle must be ‘widely applied’. This includes, to say it with Birnie and Boyle, “application to problems of global environmental risk, such as climate change and biological diversity, as well as domestically, in furtherance of the objective of sustainable development.”⁴¹ The 2004 *ILA Berlin Rules on Water Resources*, to provide an illustration of the latter, point out that the obligation under the precautionary principle to ensure that groundwater is used sustainably applies “even to an aquifer entirely within a Single state.”⁴²

The answer to the second question posed in this paragraph is that no geographic areas are excluded from the scope of the precautionary principle. This scope thus encompasses the national territory of states (land mass, air space, internal waters and territorial sea), shared natural resources (e.g., transboundary rivers and lakes), continental shelves, exclusive economic zones as well as areas beyond the boundaries of national jurisdiction (the high seas, the deep seabed, Antarctica,⁴³ the atmosphere outside national jurisdiction and outer space).⁴⁴

What Issue Areas?

As stated before, the third and fourth questions have the starting points for addressing them in common with the second. Hence, addressing them involves partly similar reasoning. Regarding the third, the circumstance that the precautionary principle is to be *widely applied in order to protect the environment* and the principle’s close association with the notion of sustainable development suggest that its reach comprises *all* environmental issue areas.⁴⁵ It simply applies *where there are threats* of environmental harm.⁴⁶ The only

³⁹ See the *Baltic Sea Convention* and *Barcelona Convention* regimes.

⁴⁰ See Article 3.

⁴¹ Birnie & Boyle, 2002, p. 117. As Handl, 1991, p. 78, puts it, the application of the principle “is not limited to transboundary risks of harm, but instead reaches environmentally sensitive activities generally, i.e., irrespective of a direct transnational impact potential.”

⁴² See (Commentary to) Article 38.

⁴³ Notwithstanding the various ‘frozen’ territorial claims.

⁴⁴ Also Trouwborst, 2002, p. 284.

⁴⁵ *Ibid.*, pp. 283-284.

⁴⁶ See Principle 15 of the *Rio Declaration* and similar provisions.

restrictive qualifications in relevant formulations concern the *gravity* and *likelihood* of damage, a matter pertaining to the domain of thresholds of harm and likelihood.⁴⁷ The suggestion that the precautionary principle covers all environmental issue areas is in conformity with previous considerations regarding the *origins* and *types* of threats to the environment. In respect of the origins or causes, one will remember the discussion above on natural, technological and mixed risks.⁴⁸ It was concluded there that none of these categories was likely to fall outside the reach of the precautionary principle – even though in reality the principle’s significance would probably remain modest with respect to threats with a purely natural cause. As to types of harm, it was confirmed above that the scope of the precautionary principle expressly encompasses threats of harm to the intrinsic value of the environment, that is, harm to nature as such, in addition to damage to resources and amenities of direct value to man.⁴⁹

This wide ambit is reflected in the practice of states, in which the precautionary principle has been applied to a huge variety of environmental issue areas, ranging from offshore activities to trade in endangered species, from climate change to the protection of the Rhine, from the effects of road construction to high seas fisheries, from POPs to GMOs and from albatross protection to the ozone layer.⁵⁰ The reach of the precautionary principle, in answer to the third question, thus spans the natural environment in the broadest sense, i.e., all parts and processes that make up the interlinked whole of air, soil, water, flora and fauna.⁵¹ Human health may be deemed as included within this reach as far as its protection from adverse environmental impacts is concerned. As set out before, however, it is doubtful whether as a matter of customary international law the precautionary principle also covers health issues *in stricto sensu* such as food safety.⁵²

What Activities?

The answer to the fourth question is now rather obvious. If the precautionary principle is to be widely applied in order to protect the environment as a whole and asks for preventive and abatement action to be taken wherever there is a sufficiently qualified threat of environmental harm, then *all* plans, activities, products and technologies that might pose such a threat are *prima facie* eligible for such action, in light also of sustainable development. A precautionary approach must accordingly be adopted

⁴⁷ See *supra* paragraphs 3.2, 3.3, 4.3 and *infra* paragraph 5.3.

⁴⁸ See *supra* paragraphs 3.1 and 3.4.

⁴⁹ *Ibid.*

⁵⁰ See, *inter alia*, Trouwborst, 2002, pp. 110 and 131.

⁵¹ *Ibid.*, pp. 283-284; see also Backes *et al.*, 2002, p. 236.

⁵² See *supra* paragraph 1.2.

consistently to “all human endeavors.”⁵³ In order to protect fish stocks, precautionary action should be taken with respect to all factors adversely affecting stock development, not just one or two. Thomas and Grader have illustrated this by drawing an analogy with vessel safety: “if we use a precautionary approach and change the engine oil every time we come in to dock, but never paint the boat or take any measures to keep it from rotting we’re still going to sink.”⁵⁴

A problem that is of relevance in this context relates to the dual task of administrations to regulate both existing, ‘old’ dangers like air pollution from automobiles as well as ‘new’ hazards, like the potential risks associated with modern biotechnology.⁵⁵ According to some researchers, governments are inclined to systematically treat existing risks more leniently than new ones, for the plain reason that politically speaking the vested interests surrounding settled activities and technologies tend to put more weight in the scale than the interests belonging to new ones that have not as yet become established in society.⁵⁶ The problem with this from an environmental point of view is that it can unintentionally delay or altogether prevent the substitution of existing hazardous technologies and products by potentially safer ones.⁵⁷ One example where this may just be the case is the meticulous screening of new pesticides that is common in many countries.⁵⁸ Some writers have contended that the precautionary principle does not contribute to solving this problem and indeed even aggravates it, arguing that only new technologies are ‘prone’ to application of the principle while relatively dangerous older technologies are not.⁵⁹ It is submitted here that this conception is erroneous insofar as public international law is concerned. There is nothing to insinuate that under the precautionary principle as agreed upon by the international community of states, precautionary action is to be applied only to new activities, technologies, plans and products as opposed to existing ones. None of the formulations of the principle expressly

⁵³ 1998 *Wingspread Statement*. According to Gullett, 1997, p. 65, the precautionary principle “is apposite for the entire spectrum of environmental decision-making, including individual development decisions.” See also Pieterman & Hanekamp, 2002, pp. vii and 15.

⁵⁴ Thomas & Grader, 2000.

⁵⁵ Wildavsky, 2000, p. 39, quoting Huber, P., “The Old-New Division in Risk Regulation”, in: 69 *The Virginia Law Review*, 1983, pp. 23-32.

⁵⁶ E.g., Wildavsky, *ibid.*, p. 40. “To wipe out tangible benefits people already enjoy – familiar products, traditional jobs [...] – is politically more difficult to do than to stop something new that is not yet surrounded with a self-protective belt of interest.” *Ibid.*

⁵⁷ *Ibid.*, p. 39.

⁵⁸ Foster, D., “Letter to the Editor”, in: *Regulation*, March/April 1984, p. 2; as cited in Wildavsky, *ibid.* On the regulation of existing and new pesticides see also *infra* paragraph 8.2.

⁵⁹ Pieterman, 2001, p. 1029; Pieterman & Hanekamp, 2002, p. 15.

takes this approach.⁶⁰ Instead, state practice confirms that the only criteria for triggering the application of the precautionary principle are the respective thresholds of harm and likelihood. When these are crossed precautionary action to prevent or abate the environmental hazard in question is considered appropriate, regardless whether this threat ensues from old or new factors.⁶¹ By way of one illustration, the US *Fisheries Recovery Act* explicitly provides that the precautionary approach applies to “any existing or proposed action” affecting marine life.⁶² It may be that uncertainties are generally, albeit not always, greatest where proposed activities are at stake.⁶³ This does not in any way imply, however, that in such cases there are more often reasonable grounds for concern that harm may be caused than in respect of existing activities. In conformity with this, the principle is being applied by states to risks emanating from long-standing activities such as established fisheries as much as to new risks such as those associated with genetic modification.

In accordance with the answer to the fourth question already given above, in legal terms the precautionary principle covers old and new risks alike. As phrased in one domestic legislative act, for governments this means that the principle “shall be applied to *all* policy and regulatory decisions of the administration,” whether they concern permission for the continuation of existing activities, technologies and products or the introduction of new ones.⁶⁴ Where the principle *is* applied selectively to new risks only, this is apparently not in consonance with international law.

5.3. *When? – A Closer Look at Thresholds*

As it seems, the only factors delimiting the applicability of the precautionary principle in international law are the thresholds of gravity and likelihood that have been defined in the foregoing chapters. These embody objective tests.⁶⁵ The logical next query, and a crucial one for practical purposes, is how to

⁶⁰ Also Marr, 2003, p. 224; Bodansky, 2004, p. 389.

⁶¹ Perhaps this is what is meant in the 1995 *Land-Based Activities Action Programme* where it states that the precautionary approach “should be applied through preventive and corrective measures” (paragraph 24, emphasis added) – although the latter are arguably aimed at the prevention of environmental harm just as much as the former.

⁶² US Gilchrest-Farr *Fisheries Recovery Act* (HR 4046), as quoted in Thomas & Grader, 2000.

⁶³ Bodansky, 2004, p. 389.

⁶⁴ 1997 *Massachusetts Precautionary Principle Act*; emphasis added. Judge Wolfrum in his Separate Opinion appended to the ITLOS *Mox Plant* Order of 3 December 2001, also stated explicitly that the principle applies to any state “interested in undertaking or continuing” potentially harmful activities.

⁶⁵ Compare, e.g., Foster, 2001, p. 597.

determine in concrete instances whether the thresholds in question are traversed or not. Knowing *what* the thresholds are, *when* are they crossed? In other words, when exactly are there 'reasonable grounds for concern', when does a given impact qualify as 'harm' and when is anticipated environmental harm 'significant', 'serious' or 'irreversible'? Who is to answer these questions and how?

The assessment of whether these thresholds are traversed may, at first glance, seem an utterly subjective exercise. In the end, what one person, or government, regards as serious harm another might regard as negligible.⁶⁶ Nevertheless, although there is undoubtedly such a subjective side to the matter, this is not the whole story. In the assessment in question there will often be room for subjectivity, but this room may be narrowed down in more than one way, depending on the particular threshold under consideration and the circumstances of each situation. A closer look at the various thresholds conditioning the precautionary principle will clarify this point. This look will be taken in the by now familiar order: first harm, then likelihood.

When taking this closer look it is useful to bear in mind the historical development of thresholds. The attitude of the international community towards the deterioration of the natural environment is rather different now from what it was a hundred years ago. "The question of determining what is significant harm in the modern world is not the same as determining what was significant harm in the *interbellum*."⁶⁷ By way of a first clue, therefore, it may be assumed that thresholds of harm have lowered over time. They have become easier to cross, so to speak. Cases of environmental degradation that failed the test of significance or were not even considered harmful in the first place in the days of the *Trail Smelter* case, may well pass the threshold of significance or even that of seriousness if they were to happen today.⁶⁸

In respect of the first leg of the precautionary tripod, Chapter 3 rendered several distinct stages of legal relevance. These stages correspond to three consecutive questions that need to be addressed when endeavoring to establish the degree of applicability of the precautionary principle to a given anticipated environmental impact:

- (1) Is the anticipated impact adverse?
- (2) If so, is the anticipated harm also significant?

⁶⁶ Morris, 2000(b), p. 14; Lambers, 2000, p. 180; Freestone, 1999, p. 137; Matthee, 2001, p. 184; Bouma *et al.*, 2002, p. 15.

⁶⁷ Lefeber, 1996, p. 87.

⁶⁸ Also International Law Commission, 2001, Commentary to Article 2(a) of the *Draft Articles on Harm Prevention*, paragraph 7.

- (3) If so, is the anticipated significant harm also serious and/or irreversible?⁶⁹

Is the Anticipated Impact Adverse?

Environmental change, to begin with the first question, qualifies as harm only when it is negative. In the context of the precautionary principle the impairment of values of nature to humans and the impairment of the intrinsic value of nature both count as adverse.⁷⁰ As has been shown above, distinguishing between beneficial, neutral and detrimental impacts, between welcome and unwelcome ones, is not always unproblematic.⁷¹ The assessment of net effects will sometimes be a complicated affair.⁷² And reference is not made here to the difficulty of predicting *what* the environmental effects of a certain activity will be. That problem pertains to the domain of uncertainty, the second leg of the tripod. At issue here is the difficulty of estimating how particular environmental effects, i.e. deviations from environmental baseline conditions, that can be envisaged – irrespective of their likelihood of occurrence – are to be *valued*. A given envisionable impact scenario may favour one species while hurting another. The overall assessment of the net effect here may depend on many factors, such as the global conservation status of the two species, the trends in the development of their respective numbers, the relative vulnerability of the populations involved, etcetera. Other scenarios may spell negative effects on a local scale but positive effects on a global scale. Windmills erected for the purpose of energy generation, for instance, kill birds and disfigure landscapes, but help fight climate change by reducing reliance on fossil fuels. Often, however, the matter will be more clear cut. The net environmental effects of clearcutting an old-growth forest, overexploiting a fish stock, draining a wetland or polluting a river, to name a few common activities, are evidently adverse. *Ergo*, in many cases room for subjectivity will be very limited or altogether absent. It quite suffices, to take one example, to imagine denying the adversity of the net impact on the environment of constructing a new highway through a rural or wilderness area.

Is the Anticipated Impact Significant?

Having ascertained the harmful nature of an anticipated environmental impact, the next question is whether the adverse effect would also qualify as significant. The precautionary principle, after all, does not apply to insignificant harm. When compared to the question of significance the issue of adversity as such

⁶⁹ See *supra* paragraph 3.4, especially Figure 3.

⁷⁰ See *supra* paragraph 3.1.

⁷¹ *Ibid.*; also Klinke & Renn, 1999, p. 10.

⁷² Generally, see Beeckman, 1996.

suddenly appears rather straightforward. What is required now is a more subtle exercise. To elucidate this point it might help to call to mind the scale of gravity of harm depicted earlier in Figure 1. The question here is no longer *whether* the impact at stake is represented on the axis, but *where* it is located on the axis. The answer, in other words, lies somewhere on a sliding scale. It will be remembered that harm qualifies as significant when it is tangible, appreciable and measurable, as opposed to minor or trivial.⁷³ (Again, the present discussion is not concerned with the probability of harm materializing; the precautionary principle is about the avoidance of tangible and measurable harm, not about effects that must be tangible and measurable before measures are taken!) The threshold of significance is thus a relatively low one.

But how exactly is one to draw the line between harm which is significant and harm which is not? There is no such thing as an authoritative manual on the threshold of significance.⁷⁴ Significance is a general notion and, as the International Law Commission put it, “not without ambiguity.”⁷⁵ Value judgments by those responsible play a more frequent and more substantial role here than in respect of the first question just dealt with.⁷⁶ Naturally, this role is conditioned by the specific circumstances of each case.⁷⁷ Varying factual circumstances are bound to influence to a considerable extent the outcome of any assessment of expected gravity of harm. And there are as many cases as there are projects, activities, technologies and products potentially affecting the environment. Different regions, ecosystems and species have different sensitivities, carrying capacities and vulnerabilities to change. A single activity may have a significant impact in one place and a minor one in another.⁷⁸ Thus, as the EU Court explained in the *Cockle Fisheries Case*, when determining the severity of threatening environmental harm due regard must be had for the specific environmental characteristics and circumstances of the area concerned.⁷⁹ It may also be that a certain activity does not by itself give rise to significant harm, but does so in combination with others. Under EU nature protection law, to name an example, such cumulative effects are part and parcel of the assessment whether the expected impact of a particular activity

⁷³ See *supra* paragraph 3.2.

⁷⁴ Lefeber, 1996, p. 87.

⁷⁵ International Law Commission, 2001, Commentary to Article 2(a) of the *Draft Articles on Harm Prevention*, paragraph 4.

⁷⁶ Freestone, 1999, p. 137.

⁷⁷ International Law Commission, 2001, Commentary to Article 2(a) of the *Draft Articles on Harm Prevention*, paragraphs 4 and 7.

⁷⁸ E.g., Harding & Fisher, 1994, p. 252, contend in regard of Australia’s natural assets that the “extraordinary diversity of ecosystems, which are unique on the world stage” imply that “impacts are likely to be perceived as significant.”

⁷⁹ Case C-127/02, Judgment of 7 September 2004, paragraph 48.

qualifies as 'significant'.⁸⁰ Other beacons to steer by are embodied by factors such as the geographic dispersion and the longevity of harmful effects.

This is not all. Environmental law and policy instruments may provide indicators further defining the room eventually available for value determinations by decision makers when verifying whether anticipated harm is to be considered significant. A rather obvious one involves the breach of substantive norms of public international law, such as internationally agreed quality standards for river water or air purity, or commitments regarding the conservation of particular populations of wildlife. To hold that environmental effects which transgress such norms can be dismissed as insignificant is evidently a mission impossible. Once more, such norms may differ from place to place. Standards for the water of the Rhine will not necessarily coincide with those for Yangtze River water. Legal and policy documents and other formal expressions by one or more states may, in addition, contain explicit testimony as to what is deemed significant. The adverse environmental effects of converting a swamp into arable land are clearly not trivial to a state which has acknowledged "the fundamental ecological functions of wetlands as regulators of water regimes and as habitats supporting a characteristic flora and fauna."⁸¹ Formal statements of this kind abound, at both international and national levels, and can offer important guidance in a lot of instances. Needless to say, like considerations apply to the adversity test. The following provision, for instance, evinces the adversity as well as the significance of various threats to European forests:

Considering the adverse effects on forests in some parts of Europe of storms, inadequate management, pests, diseases, game, overgrazing and unregulated browsing, and of inadequately planned large industrial and infrastructure development, and being concerned over the destruction of large areas of forest by fires, [...].⁸²

Some environmental instruments even contain elaborated checklists for assessing significance in relation to their subject matter. Specific guidance has been developed, for example, by the European Commission so as to facilitate the implementation of the *Habitats Directive* by EU member states.⁸³ All together

⁸⁰ See, e.g., the *Cockle Fisheries* judgment, *ibid.*, paragraphs 53 and 61.

⁸¹ Second preambular paragraph of the 1971 *Convention on Wetlands of International Importance (Ramsar Convention)*.

⁸² Preambular paragraph K from *Resolution H1* of the 1993 Helsinki Ministerial Conference on the Protection of Forests in Europe.

⁸³ The guidance document in question sets out a non-exhaustive list of significance assessment factors, *inter alia*: the character and perceived value of the affected environment; the magnitude, spatial extent and duration of the anticipated change; the resilience of the environment to cope with change; the existence of policies, programmes, plans, etc. which can

the indicators discussed here compose a framework within which the pertinent authorities of states make determinations concerning the severity of potential harm, a framework which can take on varying shapes and sizes depending on the circumstances at hand.

Is the Anticipated Impact Serious?

The procedure is similar with respect to the first half of the third question listed above. That is, will the significant adverse effect that is anticipated also constitute serious harm? If so, as demonstrated earlier, precaution becomes mandatory.⁸⁴ Although the purpose this time is to find out whether threatening environmental harm would qualify as serious or not, the question that needs answering in order to achieve this purpose is essentially the same as in the significance test. Namely: *how* grave is the anticipated harm? After all, the threshold of serious (or irreversible) harm intersects the same sliding scale of gravity as the threshold of significant harm.⁸⁵

Two typical indicators of gravity that were already mentioned are the duration and geographic extent of environmental harm.⁸⁶ The further on the scales of space and time, the more significant and/or serious an impact will be considered. This may be pictured as follows:

be used as criteria; and the existence of environmental standards against which a proposal can be assessed (e.g. air quality standards, water quality standards). European Commission, 2001, p. 62.

⁸⁴ See *supra* paragraphs 3.3 and 3.4.

⁸⁵ See *supra* Figure 2.

⁸⁶ Klinke & Renn, 1999, p. 12; DeFur & Kaszuba, 2003, p. 155; Bodansky, 2004, p. 387; see also *supra* paragraph 3.3. The extent and persistency of possible damage are also named as indicators of gravity by the European Commission in Communication COM (2000)1, p. 14.

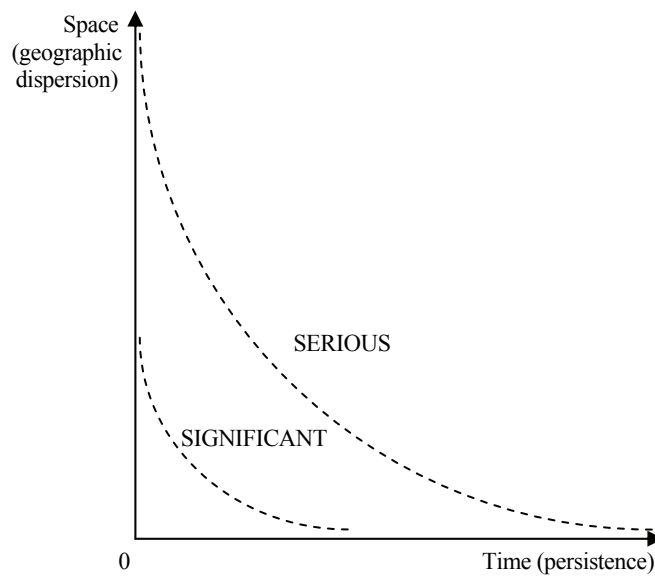


Figure 6. *Time and space as indicators of gravity of harm.* To a degree, the gravity of environmental harm is a function of temporal persistence and spatial distribution. The more enduring or widespread the harm – i.e., the further to the right or to the top of the diagram – the more significant and/or serious it will be qualified. The two curves represent the respective thresholds of significant and serious harm.

Within the more or less triangular space at the bottom left of the diagram are plotted harmful effects that are so geographically confined and of such brevity that they are deemed insignificant. Conversely, away towards the top right of the diagram instances of virtually ubiquitous and highly persistent harm can be found. Such cases of extremely serious harm belong to a risk class that Klinke and Renn have dubbed Pandora's Box.⁸⁷ The evil powers released when the box was opened were so many and so dark that they obscured the very sun. The pinnacle of spatial extension is omnipresence. Hazards of this kind are of worldwide proportions, happening at a scale where there is, to put it with the European Environment Agency, only one experimental model.⁸⁸ The pinnacle of temporal extension, closely related, is the point at which damage becomes irreversible. Irreversibility, which forms a single threshold together with seriousness, will receive separate attention below.

⁸⁷ Klinke & Renn, *ibid.*

⁸⁸ European Environment Agency, 2001, p. 171.

As with significance, the question whether harm is serious is decided first and foremost, in the words of the ILC, by “factual and objective criteria”, although value judgments may also be expected to play a part.⁸⁹ The room reserved for the latter is determined by the former. The actual division between objective and subjective elements will again vary from case to case, depending on the circumstances. As Lauterpacht put it when acting as counsel for Malaysia in the ITLOS *Land Reclamation* case, the “seriousness of damage increases as the scope for damage decreases.”⁹⁰ The smaller the population of an endangered species, the sooner the removal of even a few specimens will be deemed ‘serious’. The same is true for ecosystems and natural habitats. This reasoning was applied to Singapore’s reclamation activities around Pulau Tekong: “The fact that so much reclamation has been carried out already only increases the seriousness of the harm that will be done to the remaining areas by reason of the reduction of the area remaining to be harmed.”⁹¹ Cumulative effects are as relevant here as in the ‘significance’ discussion. To return to Figure 6, the more towards the upper right of the diagram, the more evident the serious nature of environmental harm will be. When lion populations across the African continent are decimated as a result of habitat loss, uncontrolled hunting and disease, this undeniably constitutes serious harm. The other way around, the assessment of whether harm qualifies as serious or not will be more complicated for cases corresponding to dots in the close vicinity of the threshold line. What if, for instance, a twenty-five percent lion decline occurs due to similar causes in one National Park only? Cases of this type are the harder nuts to crack and it is here that the relative weight of subjective value determinations will be biggest.

Again as with significance, the room ultimately available for such discretionary judgments is shaped by multiple factors pertaining to the domain of international and national environmental law and policy. It is probably fair to say that the violation of substantive norms relating to nature and the environment gives rise to a presumption of seriousness, the rebuttal of which would demand sound argumentation on the part of authorities claiming that the harm in question is not serious. The characterization of an adverse impact as serious may also follow from formal statements made earlier by the state(s) concerned. One instance of such a recital manifesting the severity of harm can be taken from the 1999 *Southern Bluefin Tuna* cases, in which all three parties to the dispute agreed that the tuna stock at stake was “severely depleted” and “at its historically lowest levels” and that this was a “cause for serious biological

⁸⁹ International Law Commission, 2001, Commentary to Article 2(a) of the *Draft Articles on Harm Prevention*, paragraph 7.

⁹⁰ *Verbatim Record* of the sitting on 27 September 2003, p. 21.

⁹¹ *Ibid.*

concern.”⁹² Returning to the lion example, to a signatory state of the *World Charter for Nature* – having acknowledged the “essential” functions of ecological processes, life support systems and the diversity of life forms, “which are jeopardized through excessive exploitation and habitat destruction by man,” and aware of “the *urgency* of maintaining the stability and quality of nature and of conserving natural resources”⁹³ – the fate befalling a keystone predator such as the African lion will undoubtedly matter a great deal. This would be all the more evident if the state in question had also, as a party to the 1968 *African Convention on the Conservation of Nature and Natural Resources*, demonstrated its consciousness that “flora and fauna resources constitute a capital of *vital importance to mankind*.”⁹⁴ These are just two of many instruments that could inform the gravity assessment in a case like the current example. The greater the worth accorded to an environmental asset, the graver the harm inflicted on the asset will be deemed. Consider, for example, the value bestowed on natural heritage as defined in the 1972 *World Heritage Convention*.⁹⁵ In the opinion of the parties to this agreement, the deterioration or disappearance of any item of natural heritage constitutes “a harmful impoverishment of the heritage of all the nations of the world.”⁹⁶ It is hard to conceive how states could credibly go back on positions of this kind, whether portrayed in legally binding instruments, soft law documents or otherwise. It would take very solid arguments to convincingly maintain that impacts which were considered serious harm in the past are not viewed so any more. In light of the downward tendency of thresholds over time, discussed above, it is rather the opposite which is to be expected.

Yet another indicator relates to the concept of sustainable development. Given the close ties between this concept and the precautionary principle as discussed above, the assessment of gravity must evidently be informed by the extent to which future generations might be affected.⁹⁷ As discussed extensively in the previous chapter, it is not always foreseeable what impacts the behavior of the current generation will have on the (future) environment. Some have argued therefore, that harm is to be considered serious whenever there are grounds for concern that an activity may appreciably prejudice the interests of future generations.⁹⁸ It is submitted here that, at a minimum, such circumstances would generate a suspicion of

⁹² Paragraph 71 of the ITLOS Order of 27 August 1999.

⁹³ 1982 *World Charter for Nature*, preambular paragraphs 4(a) and 3(b); italics added.

⁹⁴ Hereinafter 1968 *African Convention*, first preambular paragraph (emphasis added); see also the first preambular paragraph of the Convention as revised in 2003.

⁹⁵ *Convention for the Protection of the World Cultural and Natural Heritage*.

⁹⁶ Second preambular paragraph.

⁹⁷ See *supra* paragraph 2.3. See also Epiney & Scheyli, 1998, pp. 118-119; Soria Jiménez, 1996, p. 393.

⁹⁸ Epiney & Scheyli, *ibid.*, p. 119.

seriousness, similar to impacts transgressing substantive environmental standards.

Is the Anticipated Impact Irreversible?

Irreversibility, the other component of the threshold of ‘serious or irreversible harm’, is a singularly laden concept. It bears upon situations where harm may be definitive, where it is a matter of all or nothing. Irreversibility has no place in the diagram of Figure 6, even if *in stricto sensu* it is an index of time. ‘Serious’ and ‘irreversible’, while forming part of the same threshold, represent different magnitudes. It is perfectly conceivable, as discussed in Chapter 3, for environmental damage to be irreversible but not serious.⁹⁹ As a threshold value irreversibility would seem less prone to subjective judgment than seriousness in that, in principle, damage is either reversible or it is not. It was explained earlier that in spite of this apparent simplicity it is possible, paradoxically, to argue both that everything is irreversible and that nothing is irreversible, depending on the angle. The bottom line was, nevertheless, that in the practice of states an apparent understanding has been formed of what the criterion implies, and that it is taken to include situations where harm is *virtually* or *practically* irreversible.¹⁰⁰

As with the other threshold criteria the question arises how to determine in specific cases whether anticipated harm is of the irreparable kind? Once again the answer may be found in previous statements by states, in which explicit clues abound. Soil, water, flora and fauna are deemed by the states parties to the 1968 *African Convention* to be “irreplaceable assets”.¹⁰¹ Wetlands, in the words of the *Ramsar Convention*, constitute a resource of great value “the loss of which would be irreparable.”¹⁰² In the *World Heritage Convention* natural heritage is described as “unique and irreplaceable”.¹⁰³ At its very outset *CITES* likewise states the recognition that “wild fauna and flora in their many beautiful and varied forms are an *irreplaceable* part of the natural system of the earth,”¹⁰⁴ whereas the 1979 *Bonn Convention* begins with a similar statement.¹⁰⁵ By way of a final example, the 1993 *European Forest Guidelines* speak of the *irreversible*

⁹⁹ See *supra* paragraph 3.3.

¹⁰⁰ *Ibid.* As Bodansky, 2004, puts it at p. 387, irreversible harm is characterized by “a very long time scale.”

¹⁰¹ Fourth preambular paragraph. According to the first preambular paragraph of the Convention as revised in 2003, African natural resources are deemed an “irreplaceable part of the African heritage.”

¹⁰² Third preambular paragraph.

¹⁰³ Fifth preambular paragraph.

¹⁰⁴ First preambular paragraph; emphasis added.

¹⁰⁵ See the first preambular paragraph. Given that the focus of the *Bonn Convention* is on migratory animals, this provision concerns fauna only.

degradation of forest soils and sites, the flora and fauna they support and the ecological services they provide.¹⁰⁶

These texts underline that the notion of irreversibility as conceived by the international community of states comprises both environmental harm which is factually irreparable, such as the extinction of species or the exhaustion of non-renewable resources, as well as harm which is practically irreversible, such as the severe depletion of fish stocks, the process of desertification or the diffusion of genetically modified crops into natural ecosystems.¹⁰⁷ It is thus not necessary – if this were at all possible – to draw a strict dividing line between the two. Arguably, the notion of sustainable development can help to determine when expected harm is to be considered irreversible. It has been submitted in this respect that in the context of the precautionary principle environmental harm is irreversible when the time required by the regenerative forces of nature to replenish what was taken away or to repair what was destroyed is likely to extend over several human generations.¹⁰⁸

To summarize, together all the indicators dealt with here define the bounds within which states can exercise discretion. Their relevance and relative weight, however, will vary from one case to the other. Consequently, in some cases the determination of whether harm is to be deemed significant, serious and/or irreversible will be left largely to the discretion of state(s) involved, while in others there may be precious little room for subjective judgment.

Are There Reasonable Grounds for Concern?

Moving now from the gravity of harm to the other half of environmental risk, that is likelihood of occurrence, it is time to address the question as to when there are and when there are not ‘reasonable grounds for concern’. As described above, this threshold implies that the mere theoretical *possibility* of a given level of environmental harm – “mere speculation”, as Bodansky puts it¹⁰⁹ – is not enough to trigger precautionary action, although it does not require proof of *probability* of harm either.¹¹⁰

Part of any effort to further define the parameters of the requisite ‘indications’, of the necessary ‘reasonable grounds for concern’, is the contentious issue of whether these must take the shape of some amount of, albeit preliminary, *scientific* evidence – that is, knowledge which is the outcome of systematic study and method and not merely a product of general experience

¹⁰⁶ First operational paragraph of *Resolution H1* of the 1993 Helsinki Ministerial Conference on the Protection of Forests in Europe.

¹⁰⁷ See also *supra* paragraph 3.3; Epiney & Scheyli, 1998, p. 118.

¹⁰⁸ Epiney & Scheyli, *ibid.*

¹⁰⁹ Bodansky, 2004, p. 389.

¹¹⁰ See *supra* paragraph 4.3.

or common sense.¹¹¹ Obviously, under the precautionary principle states should not wait for scientifically documented *effects* before taking measures – precautionary action must precede effects in order to prevent them – but should they perhaps wait for scientifically documented *grounds for concern*? In other words, must there be at least some scientific gist to the indications in question or can other, non-scientific pointers amount to reasonable grounds for concern as well? Extensive discussions on this question continue to take place in academic discourse. The 2002 *ILA Declaration on Sustainable Development*, for example, maintains that precautionary measures “should be based on up-to-date and independent scientific judgment.”¹¹² One writer even holds that there need be “a broad scientific consensus” that information is based on some “hard scientific evidence,”¹¹³ while according to another the threshold of reasonable grounds imposes that harm must be indicated by “some level of scientific objectivity.”¹¹⁴ Others have expressed opinions to the contrary.¹¹⁵

As for pertinent state practice, the many clauses dealt with above that call for precautionary measures in advance of ‘sufficient’, ‘adequate’, ‘absolutely clear’, ‘conclusive’, ‘complete’, ‘full’ or ‘undisputed’ *scientific* evidence *could* be taken to presume the presence, nevertheless, of *some* level of scientific information, however small.¹¹⁶ This understanding does in fact correspond to the course of things in abundant instances of precautionary action. Very often, grounds for concern *will* be based on some scientific data or other – however incomplete.¹¹⁷ The tremendously important role that scientific research plays in the identification of (potential) threats to the environment cannot be stressed enough in this respect.

¹¹¹ This common description of scientific evidence squares, *inter alia*, with the views of the WTO Appellate Body and the US Supreme Court. According to the jurisprudence of these two bodies, the decisive criterion for evidence to qualify as “scientific” is that it be derived at through the scientific method. See Foster, 2001, pp. 588-590.

¹¹² Paragraph 4.4.

¹¹³ Blanchfield, 2000.

¹¹⁴ Dzidzornu, 1998, p. 98. This may be attributed to the dissentient viewpoint expressed by the same author that the concern for, or assumption of the detrimental effect in question, “supported by inconclusive scientific evidence, must point to the *probability* of harm or threats of serious or irreversible damage.” Italics added.

¹¹⁵ E.g., Pieterman & Hanekamp, 2002, p. vii. These authors have noted the absence of any legal criterion requiring “substantial empirical scientific evidence” before the precautionary principle can be invoked – while considering this a serious flaw of the principle.

¹¹⁶ See *supra* paragraph 4.3. González Campos *et al.*, 1998, at pp. 798-799 even submit that the phrase “lack of *absolute* scientific certainty” necessarily implies that very precise knowledge has already been acquired in respect of the threat in issue although some uncertainties persist.

¹¹⁷ Marr, 2003, p. 24, affirms that precautionary action is triggered by a possibility of environmental harm “based, in most cases, on scientific suspicion.”

Much has been said and written on the relationship between the precautionary principle and science.¹¹⁸ The two concepts meet in the area of environmental risks, which often “can only be identified by scientific research, but which scientific research is unable to characterize in an unambiguous fashion.”¹¹⁹ It is probably appropriate at this point to dwell for a moment on the remarkable allegation by critics of the precautionary principle that the principle would be ‘unscientific’, an allegation that recurs surprisingly often.¹²⁰ Surprisingly, because the relationship between precaution and science is really quite straightforward. It was scientific research that revealed the serious and irreversible nature of much environmental harm wrought by human action. It was scientific research that revealed the complex nature of ecology and the unpredictability of environmental effects. It is scientific research that is needed for the early detection of potential environmental hazards. It is scientific research that is needed for the reduction of existing uncertainties and the contribution of new data in the light of which precautionary measures taken can be evaluated and, if need be, modified or cancelled. Science has thus not only laid the very foundation of the precautionary principle, it also continues to be an indispensable and pre-eminent tool for the principle’s implementation.¹²¹ Undeniably, science and precaution are mutually reinforcing. The precautionary principle is evidently all but unscientific.

Having said this, it must be asked whether this entails that the precautionary principle can never find application in situations where there is no scientific evidence at all to back a particular environmental threat. The answer to this question, it is submitted here, must be in the negative, for the plain reason that it is not possible to distil any clear rule of this purport from the pertinent practice of states. The affirmation that science plays a predominant role in the early detection of potential threats means no more and no less than that. It does not play the *only* role. Sometimes reasonable grounds for concern leading to precautionary action consist of warnings, signals and clues of a not strictly scientific caliber.

Consideration of the criterion which requires decisions to be based on the ‘best scientific information available’, occurring in various instruments in various forms as discussed previously,¹²² is exemplary. As stated above, this criterion can be understood, at first sight, to suggest the availability of at least

¹¹⁸ See, e.g., De Sadeleer, 2002, pp. 174-201; Marr, 2003, pp. 24-34; Tanaka, 2005, pp. 954-956.

¹¹⁹ Von Moltke, 1999.

¹²⁰ See *supra* paragraph 1.1.

¹²¹ See *infra* paragraph 7.2.

¹²² See *supra* paragraph 4.3.

some scientific information as the basis for decisions.¹²³ It is questionable, however, whether this is the only coherent interpretation. After all, as the case may be the best scientific evidence *available* may be constituted by precious little scientific evidence, or may even consist of no scientific evidence at all. Where there is no scientific information whatsoever, the ‘best scientific information available’ is zero. That this is not much to go by is not the point. The point is that logically the requirement of ‘best scientific information available’ captures this type of situation, however undesirable, just as much as it captures situations of exhaustive scientific evidence – and everything in between the two, for that matter. The following imaginary setting may clarify this point:

- State X has taken on a duty under public international law to take all decisions affecting the environment on the basis of the best scientific information available.
- A foreign ship loaded with several chemical substances has been severely damaged in a storm, its cargo beginning to leak out into the ocean, and requests permission from the authorities of State X to enter one of its ports.
- No scientific information is available regarding the effects of the chemicals in question on the environment.

Clearly, State X will have to respond to the request by choosing one of two alternatives. Either the ship is allowed into port or sent back out to sea. Not taking a decision is simply not an option. Moreover, the decision obviously is of the kind affecting the environment. Given the absence of scientific information, non-scientific information will have to inform the decision. Does this state of affairs nullify, modify or run counter to the obligation of State X to act on the best scientific information available? It is difficult to see why or how.

In short, what the criterion of the ‘best scientific information available’ entails is this: when scientific evidence *is* available, the best of it should be taken into account when making decisions. It does *not* mean that decisions cannot legitimately be taken without scientific evidence.¹²⁴ *Ergo*, even if this criterion were universally applied in combination with the precautionary principle – and it is not – it could hardly serve as proof that the threshold of reasonable grounds for concern requires a degree of *scientific* evidence for it to be crossed.

Yet this does not take away the fact that it is normal practice for governments, and in accordance with common sense, to base decisions on the best information that can be disposed of in order to produce decisions that are

¹²³ *Ibid.*

¹²⁴ Also Marr, 2003, p. 135.

as uncontentious as possible.¹²⁵ These best available data will frequently, though not always, happen to be the result of scientific research. It would appear that the practice referred to here ought to be looked on, however, as an expression of the generally applicable requirements of accountability and good governance, rather than as a specific feature of the precautionary principle.

With respect to the precautionary principle the inescapable bottom line of the matter is that both the availability of information, scientific and otherwise, and the ostensible urgency of precautionary action tend to fluctuate hugely from case to case. The relevance of this bottom line for the question at hand may again be set out by reference to a small example. Consider the following events:

- Large quantities of dead fish, mostly roaches, are suddenly turning up on the surface of a river in State Y.
- The mortality occurs only days after the setting in motion of a new factory located upstream which is dumping a number of residual substances into the river as part of its operation.
- The effects of the substances involved on roaches or any other of the affected species have never been scientifically investigated. According to scientific experts it will take several weeks to verify whether the fish mortality is indeed brought about by (any of) the substances.
- Under the circumstances, the competent authorities of State Y order the suspension of the factory's operation until more is found out about the suspected link between the emissions and the mortality.

What is this order if not a *prima facie* legitimate precautionary measure? Although nothing is known for sure and no *scientific* evidence whatsoever is available concerning the effects of the emitted substances on the implicated species there are arguably grounds for concern that are more than reasonable that the factory emissions are the cause of considerable harm to the fluvial ecosystem. The circumstances do not permit delay. Patently, it does not always take a team of scientists to corroborate that there are reasonable grounds for concern.

In surmise, it has become manifest that in the determination of whether there are reasonable grounds for concern that environmental harm may be produced by a given activity, project, plan, product or technology, it is fitting to have recourse to the *best information available*.¹²⁶ What the 'best' information is

¹²⁵ Also Foster, 2001, p. 587.

¹²⁶ "Decisions should be based on the best available information" is also how it is put, e.g., in Section 10(a) of the New Zealand *Fisheries Act* of 1996; in paragraph 2.3 of the *PKB Waddenzee*, i.e., the major Dutch policy instrument on the Wadden Sea; and in the report *Natuur Naderbij* by the

will vary from instance to instance, and may not in all cases be immediately apparent. What *is* apparent is that the information need not always be of a scientific quality for it to constitute reasonable grounds for concern.¹²⁷ The above findings are only little astounding in the sense that the threshold extracted from state practice in the course of the previous chapter of this study was ‘reasonable grounds for concern’ and not ‘reasonable *scientific* grounds for concern’. And this is very fortunate, since the fundamental and, to be frank, rather hopeless discussion of what in fact is ‘scientific’ and what is not is thus kept at arm’s length. On the other hand, if and when relevant results of scientific research *are* obtainable these will naturally be assigned priority as a basis for deciding whether precautionary action is called for. The European Commission’s guidelines on how to apply the precautionary principle are illustrative in this respect:

An assessment of risk should be considered where feasible when deciding whether or not to invoke the precautionary principle. This requires reliable scientific data and logical reasoning [...]. However, it is not possible in all cases to complete a comprehensive assessment of risk, but all effort should be made to evaluate the available scientific information.¹²⁸

Speaking of risk, it is probably befitting in order to be complete and avoid confusion, to stress that the application of the precautionary principle is certainly not limited to calculable, or quantifiable risks, whereby gravity and likelihood of harm are both sufficiently ‘known’ for the risk concerned to be expressed in statistical numbers.¹²⁹ It is indisputable that the precautionary principle was designed to apply in situations of other classes of uncertainty as well.¹³⁰ Indeed, if the precautionary principle would not allow for anything less certain than calculable risk for it to sanction measures, then its added value in comparison with the principle of prevention – which, as described elsewhere, already mandated the prevention and countering of quantifiable risks – would

Dutch Council for Nature Management, as cited in Heukers, 1997, p. 32. Article 200(1) of the French *Code Rural* of 1995 and Chapter III, Article 9(a) of Cameroon’s 1996 *Law No. 96/12 Relating to Environmental Management*, to take two more instrument from the domestic sphere, expressly do not limit the evidence that is to inform the application of the precautionary principle to scientific information either, by requiring that account be taken of “current scientific *and technical* knowledge” (emphasis added). Neither does the 1995 *Land-Based Activities Action Programme*, which states in paragraph 24 that precautionary measures should be “based on existing knowledge, impact assessments, resources and capacities at national level, drawing on pertinent information and analyses at the subregional, regional and global levels.”

¹²⁷ See also Testart, 2000; Cooney, 2000.

¹²⁸ *Communication COM(2000)1*, p. 14.

¹²⁹ See paragraph 4.1. and Figure 4 above.

¹³⁰ Again, see *supra* paragraph 4.1.

be negligible.¹³¹ Consequently, the threshold of ‘reasonable grounds for concern’ cannot be interpreted as conditioned by a criterion of calculability. It does not correspond to a particular probability or risk percentage.

As much as with the evaluation of the gravity of anticipated harm, at times it will just be plain obvious that there are ‘reasonable grounds for concern’. However, if ‘scientific’ nor ‘quantifiable’ are rigid benchmarks in the determination of whether the threshold of reasonable grounds for concern is crossed, this makes one wonder how to act in individual instances where the best information available is despairingly puny? In the absence of these or other criteria the issue appears rather clear-cut. When it is clear that the indications involved comply with the minimum requirement of amounting to something more than a mere hypothesis, then by implication it really seems up to the government(s) in question to establish their further diagnosis of those indications as either ‘reasonable grounds for concern’ or not. In consequence, here perhaps more so than with the gravity assessment, a decisive role will be reserved for the circumstances of each case¹³² and the discretion of the state(s) concerned.¹³³

5.4. *How? – Effectiveness and Proportionality*

Retracing the steps that have been taken in the present study up to the current stage and adding them up yields the conclusion that under general international law precautionary action is appropriate when there are reasonable grounds for concern that significant, serious and/or irreversible adverse environmental effects may be caused. In the previous paragraph clues have been uncovered as to how to establish when this situation presents itself – that is, how to determine when the various thresholds involved are transgressed. Knowing at some point in time *that* precautionary action may or must be taken is, of course, not the end of the story. How to determine *what* precautionary action to take is, after all, still an open question. This question will be probed in the current paragraph and in Part Three of this study.

Effective Action

How to go about precautionary action? Effectiveness is likely to be the most fundamental prerequisite for any measure to be able to constitute a correct implementation of the precautionary principle. It is a *sine qua non*. Not heeding this requirement would render the principle meaningless and rob it of its very

¹³¹ Trouwborst, 2002, pp. 37-38.

¹³² Under Article 13 of the Czech and Slovak *Federal Act on the Environment*, Law No. 17/1992 of 5 December 1991, precautionary action is appropriate if, “considering all circumstances,” it can be assumed that irreversible or serious damage could threaten the environment.

¹³³ See also Dzidzornu, 1998, p. 98; Mathee, 2001, p. 184; Nollkaemper, 1996, p. 82.

essence. Precautionary action must be effective action.¹³⁴ This is so logical that stating it equals accepting a certain risk of being pleonastic. On account of its cardinal importance the necessity of effectiveness may not go unnoticed in a study such as the present.

Anyhow, while on most occasions it is present only tacitly by way of a necessary implication, not infrequently the condition of effectiveness in the implementation of the precautionary principle is stated expressly. In its *Southern Bluefin Tuna Order*, the ITLOS directed parties to “act with prudence and caution to ensure that *effective* conservation measures are taken to prevent serious harm to the stock of southern bluefin tuna.”¹³⁵ A comparable requirement can be found in the 2002 *Antigua Convention*.¹³⁶ Other examples occur at the domestic level, as a result of the translation of the precautionary principle into national law. For instance, according to the Supreme Court of Pakistan in its 1994 *Shehla Zia v WAPDA* judgment, the precautionary principle requires that “effective measures” should be taken to control environmental threats.¹³⁷ Under the 1997 *Massachusetts Precautionary Principle Act*, competent authorities “shall take all necessary steps to ensure the *effective* implementation of the precautionary principle to environmental protection.”¹³⁸ The pertinent laws of Cameroon¹³⁹ and France¹⁴⁰ also explicitly call for “effective” precautionary measures.

A measure is effective if it is likely to produce the outcome desired.¹⁴¹ The stated objective of the precautionary principle, to use the straightforward formulation from the *Rio Declaration*, is “to protect the environment”.¹⁴² Protection of the environment, in turn, is a vital condition for the achievement of sustainable development.¹⁴³ What are effective measures will depend on the specific circumstances of each instance, among other things on the kind of harm that is to be prevented or abated. The precautionary principle, to borrow the words of the Slovenian *Environmental Protection Act*, mandates “such actions as may be necessary.”¹⁴⁴ Where there are, for example, reasonable grounds for

¹³⁴ Epiney & Scheyli, 1998, p. 123.

¹³⁵ Order of 27 August 1999, paragraph 77; italics added.

¹³⁶ Article 5(6)(a): “effective measures to prevent environmental degradation”.

¹³⁷ *Shehla Zia v WAPDA*, PLD, 1994 Supreme Court 693.

¹³⁸ Emphasis added.

¹³⁹ *Law No. 96/12 Relating to Environmental Management* of 5 August 1996, Chapter III, Article 9(a).

¹⁴⁰ 1995 *Code Rural*, Article 200(1).

¹⁴¹ Lefeber, 1996, p. 61. At p. 18 of the European Commission’s *Communication COM(2000)1* it is put as follows: “The measures envisaged must make it possible to achieve the appropriate level of protection.”

¹⁴² Principle 15. See also *supra* paragraph 3.1 and *infra* Chapter 6.

¹⁴³ See *supra* paragraph 2.3.

¹⁴⁴ 1993 *Act No. 801-01/90-2/107*, Article 8(4), as cited in Marr, 2003, p. 95.

concern that significant irreversible harm may be caused, then a course of precautionary action must be chosen that is likely to effectively prevent this significant irreversible harm.¹⁴⁵ In case of doubt as to whether particular measures are actually suitable for this purpose, it is in conformity with the precautionary principle to err on the side of caution. *In dubio pro natura*.

What it takes for the principle to be effectively implemented is, to quote from the argumentation of Australia and New Zealand in the *Southern Bluefin Tuna* cases, “caution and vigilance in decision-making”,¹⁴⁶ that is, a stance on the part of governments that is not only careful but active as well.¹⁴⁷ As early as the year 1986 the government of the Federal Republic of Germany set out its belief that the *Vorsorgeprinzip* required the taking of “active measures”.¹⁴⁸ Additional guidance in this respect can be drawn from the classical formulation of the precautionary principle in the 1990 *Bergen Declaration*, often repeated afterwards, stipulating that precautionary measures “must anticipate, prevent and attack the causes of environmental degradation.”¹⁴⁹ The criterion of effectiveness will be treated in further detail below.¹⁵⁰

Proportional Action

In public international law, proportionality is another concept of considerable importance besides effectiveness.¹⁵¹ To bring this home one need only think of the rules governing the use of armed force in interstate relations, of international trade law, or of the rules on the legitimate use of countermeasures.¹⁵² In a way proportionality can be seen as a counterweight to the criterion of effectiveness. Effectiveness ensures that the relevant purpose is served; proportionality ensures that this is *all* that happens and no more than that, by adjusting the means to the objective. It is not always easy to strike the right balance between the two, however. As for precautionary behaviour, it has been submitted that the balance between opportunity and risk is always a

¹⁴⁵ In the words of Kaiser, 1997(b), p. 328, precautionary action must be “designed to effectively reduce the likelihood of the perceived environmental harm.”

¹⁴⁶ See the *Request for Provisional Measures* filed on 30 July 1999.

¹⁴⁷ Epiney & Scheyli, 1998, p. 123.

¹⁴⁸ See Gullett, 1997, p. 59.

¹⁴⁹ Paragraph 7 of the *Bergen Declaration*. See also, *inter alia*, preambular paragraph 8 of the *Biodiversity Convention*; Principle 7 of the 1990 *Ministerial Declaration of the Second World Climate Conference*; paragraph 11 of the 1996 *Vellore Citizens* judgment by the Supreme Court of India; and the different version in Article 3(3) of the *ASEAN Agreement on Transboundary Haze Pollution* (“anticipate, prevent and monitor”).

¹⁵⁰ See *infra* Chapter 7.3.

¹⁵¹ Generally, see Cannizzaro, 2000, *passim*.

¹⁵² For the latter, see paragraphs 85 through 87 of the *Gabcikovo-Nagymaros* judgment.

precarious one.¹⁵³ There have always been those who warned against the disadvantages of an overabundance of prudence. Napoleon was one of them:

The torment of precautions often exceeds the dangers to be avoided. It is sometimes better to abandon one's self to destiny.¹⁵⁴

And Russian writer Aleksandr Solzhenytzin once sighed: “If one is forever cautious, can one remain a human being?”

From the start, proportionality has been a crucial feature in the application of the precautionary principle, in the sense that precautionary responses to environmental threats ought to correspond to the perceived dimensions of the risks involved. This notion is firmly anchored in pertinent state practice, in the first place through the widely disseminated use of thresholds of harm that was discussed in Chapter 3 above.¹⁵⁵ Threats of effects that are not adverse or of trivial harm do not call for precaution; threats of significant harm reserve the right of states to take action; and threats of serious or irreversible harm oblige states to do so – given the presence of reasonable grounds for concern, that is. This three-stage plan, which must be assumed to represent the current state of customary international law on the precautionary principle, is an expression *pur sang* of the idea of proportionality: the graver the anticipated harm, the more substantial the accompanying legal consequence.¹⁵⁶

By no means does this exhaust the relevance of proportionality, however. It is also of the essence on the smaller scales *within* the stages of the scheme. The *more* significant or the *more* serious the expected environmental impact, the more rigorous preventive or abatement measures may, respectively must be. As put by the International Chamber of Commerce, precautionary action must be “proportionally responsive” to the environmental concerns in question.¹⁵⁷ It is not difficult to see the logic inherent in such an approach whereby, to paraphrase the 1986 propositions of the WCED legal experts group, requirements of alertness and precaution are connected to the gravity of possible damage.¹⁵⁸ Phrased in terms of the diagram of *supra* Figure 2: the higher the feared harm on the scale of gravity, the more radical the precautionary action to counter it, and the other way around – regardless of whether such action is taken pursuant to a right or to an obligation.

¹⁵³ Klinke & Renn, 1999, p. 9.

¹⁵⁴ Napoleon Bonaparte (1769-1821).

¹⁵⁵ Also Backes *et al.*, 1997, pp. 71-72; Backes, 1997, p. 4.

¹⁵⁶ As Rogers, 2001, at p. 8 remarked, “if the harm is neither serious nor irreversible, then ‘doing nothing’ is clearly a proportionate response to uncertainty.” In legal terms, this certainly appears to be true.

¹⁵⁷ International Chamber of Commerce Commission on Environment, *A Precautionary Approach: An ICC Business Perspective*, 1997, as quoted in Backes *et al.*, 2002, p. 79.

¹⁵⁸ Lammers *et al.*, 1986, p. 80.

Accordingly, in the words of the commentary on the 1986 WCED *Legal Principles for Environmental Protection and Sustainable Development*, the nature and extent of the measures to be taken depends on the nature and extent of the harm which must be prevented or abated.¹⁵⁹ As far as the axis of gravity is concerned, it is thus often not sufficient to ask only *whether* threatened environmental harm is expected to be significant, or serious. That question should, whenever matched by an affirmative answer, be followed by the question as to *how* significant or serious that harm may turn out to be.

Of course, the frameworks of the concept of risk and the precautionary principle alike are not composed of a single axis. Gravity of harm is not the only variable in the formula of risk, nor is it the sole determinant of legal consequences under the precautionary principle. To complete the picture an axis of probability needs to be added to the axis of gravity. Similar considerations apply here. The threshold of reasonable grounds for concern intersects the axis of likelihood. Below it the precautionary principle does not apply, above the threshold it does – supposing for the moment that none of the thresholds of gravity prevent this. Again, this state of affairs by itself reflects the idea of proportionality but does not exhaust its relevance. The axis of likelihood, like the axis of gravity, represents a sliding scale. The more evidence there is relating to the suspected causality involved, i.e. the more likely the occurrence of the anticipated harm is – and thus the higher on the scale of likelihood it is found – the more rigorous the corresponding precautionary measures ought to be, and *vice versa*.¹⁶⁰

What holds true for the scales of gravity and likelihood separately naturally holds true for the combination of the two: the aggregate risk. Being communicating vessels, the two sliding scales *together* determine the final proportions of the environmental risk in any given case, and therewith the final precautionary response required.¹⁶¹ Thus, as will be remembered from the treatment of the risk concept earlier on, in cases of comparable likelihood of occurrence graver anticipated harm always results in greater risk. And the greater the risk, the more rigorous the precautionary action that is to match it.¹⁶²

In keeping with its great logical appeal the validity of the proportionality criterion in respect of the precautionary principle has often been

¹⁵⁹ *Ibid.*, see Principles 10 and 15-17.

¹⁶⁰ Also Backes *et al.*, 2001, p. 1761.

¹⁶¹ *Ibid.*

¹⁶² As the commentary to Article 7 of the 1995 *IUCN Draft Covenant* puts it: “action will vary in accordance with the severity of the risk.”

affirmed, both implicitly and explicitly,¹⁶³ and only rarely contested. Its application has been standard practice, e.g., in the birthplace of precaution as we know it, namely Germany: “the greater the threat, the greater the need for *Vorsorge*.”¹⁶⁴ Belgium,¹⁶⁵ France,¹⁶⁶ the UK,¹⁶⁷ Cameroon¹⁶⁸ and New Zealand¹⁶⁹ are some of the countries providing further examples. The concept of proportionality can be aptly illustrated by reference to the following provision of the *World Charter for Nature*, in which both the gravity and the probability of harm are intimately linked to the strictness of measures:

Activities which might have an impact on nature shall be controlled, and the best available technologies that minimize significant risks to nature or other adverse effects shall be used, in particular:

- (a) Activities which are likely to cause irreversible damage to nature shall be avoided;
- (b) Activities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination; their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed;
- (c) Activities which may disturb nature shall be preceded by assessment of their consequences, and environmental impact studies of development projects shall be conducted sufficiently in advance, and if they are to be undertaken, such activities shall be planned and carried out so as to minimize potential adverse effects; [...].¹⁷⁰

In its jurisprudence the ECJ has also frequently stressed the importance of proportionality in the implementation of the precautionary principle, which is

¹⁶³ See, e.g., Van Dyke, 1996, p. 380; Gullett, 1997, p. 59; Freestone, 1999, p. 140; Lambers, 2000, p. 177; Rogers, 2001, pp. 4-5; Mohamed-Katerere, 2001, p. 9; Backes *et al.*, 2001, pp. 1760-1761; Birnie & Boyle, 2002, p. 120; Marr, 2003, pp. 35-37; Faure, 2003, p. 256.

¹⁶⁴ Boehmer-Christiansen, 1994, p. 36; also Marr, 2003, pp. 75 and 91.

¹⁶⁵ See the overview of Belgian and Flemish policy and law in Faure, 2003, and particularly p. 256.

¹⁶⁶ See Kourilsky, P.H. & Viney, G., *Rapport au Premier Ministre, le Principe de Précaution*, Paris 2000, as cited in Faure, *ibid.*, at p. 256.

¹⁶⁷ See Royal Commission on Environmental Pollution, *Twenty-first Report ‘Setting Environmental Standards’*, London 1998, paragraph 4.44; UK Department of the Environment, *Consultation Paper on the UK Strategy for Sustainable Development*, July 1993, as cited in Haigh, 1994, p. 250; UK Government’s *A Better Quality of Life: A Strategy for Sustainable Development for the United Kingdom*, May 1999, paragraph 4.2.

¹⁶⁸ 1996 *Law No. 96/12 Relating to Environmental Management*, Chapter III, Article 9(a).

¹⁶⁹ Both elements of proportionality are clearly present in the following pronouncement on the general precautionary principle by the New Zealand Environment Court: “Like all elements that contribute to the ultimate judgment, the weight to be given to the precautionary principle would depend on the circumstances. [...] The circumstances would include the extent of present scientific knowledge and the impact on otherwise permitted activities. However, we think that in an appropriate case they would also include the gravity of the effects if, despite present uncertainty, they do occur.” *McIntyre v Christchurch City Council*, PA T 15/96, 5 March 1996, 1996 NZRMA (New Zealand Resource Management Act) 289, as quoted in Christensen, 2001, p. 6.

¹⁷⁰ Principle 11.

to ensure that of the available effective measures the least restrictive is chosen.¹⁷¹ As the European Commission has commented: “In some cases a total ban may not be a proportional response to a potential risk. In other cases, it may be the sole possible response.”¹⁷² It appears open to little doubt that the latter would be the case in the relatively extreme situation where threatened harm is both probable, very serious and irreversible. All in all, that under customary international law the application of the principle ought to be informed by the doctrine of proportionality in the way set out in the current paragraph seems to make good sense.

The workings of this doctrine are set out graphically in simplified form in Figure 7, to illustrate what has just been said about aggregate risks and communicating vessels. To return to the three core elements of the precautionary principle, it is noteworthy that in the picture the element of action does not relate to any axis of its own in the way that the elements of harm and uncertainty relate, respectively, to the axes of gravity and probability. When combining the three basic features of the precautionary principle graphically, no third dimension appears. Graphically, no tripod appears. Instead, since the nature and extent of precautionary action depends on the degrees of harm and likelihood involved, the element of action is a function of the other two and can be depicted as such. Accordingly, in the diagram of Figure 7 it is represented by coordinates. The higher the combined value of the coordinates, that is, the further to the right and/or to the top of the diagram, the more rigorous the resultant precautionary action.

¹⁷¹ For one example out of many, see paragraph 186 of Joined Cases T-74/00, T-76/00, T-83/00 to T-85/00, T-132/00, T-137/00 and T-141/00, Judgment of the EU Court of First Instance of 26 November 2002. See also Vos, 2003, pp. 152-153.

¹⁷² *Communication COM(2000)1*, p. 18.

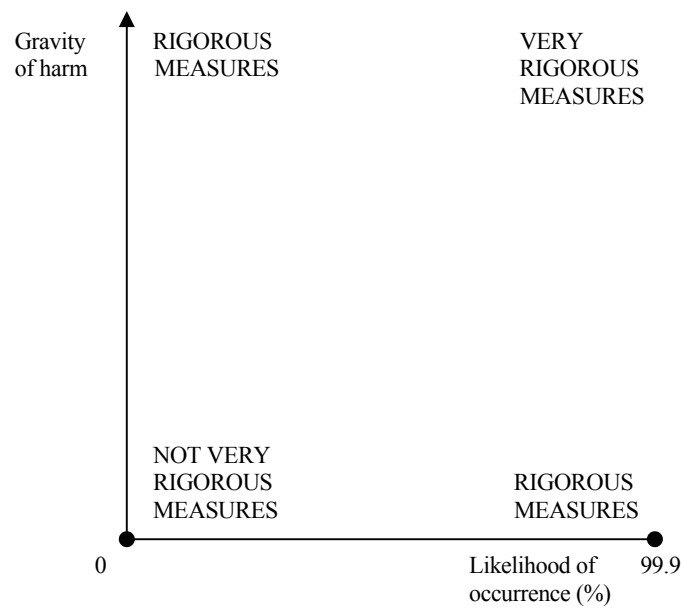


Figure 7. Proportionality (I). Each imaginary point in this diagram represents an aggregate risk, a combination of likelihood and gravity of environmental harm. The further on the scale of gravity and/or on the scale of likelihood, the greater the risk and the more rigorous the precautionary measures that may or must be taken. The various legally significant thresholds of gravity and proof have been left out of the picture for simplicity's sake.

In the next figure the three major threshold lines have been included in the same diagram to demonstrate a more complete picture of precautionary action under international law. (See Figure 8.) After all, account needs to be taken of the fact that some coordinates do not represent precautionary measures for the bare reason that the corresponding level of gravity and/or probability finds itself on the wrong side of one of the thresholds that have been found to condition the application of the precautionary principle. It will be apparent that what has been stated previously on the question as to how to determine when the various pertinent threshold lines are crossed, applies just as much to the question as to how to determine *how* significant, *how* serious and *how* probable anticipated environmental harm is to be deemed – the latter question being hardly less important for the purpose of making the right choice of precautionary measures than the former.¹⁷³

¹⁷³ See *supra* paragraph 5.2.

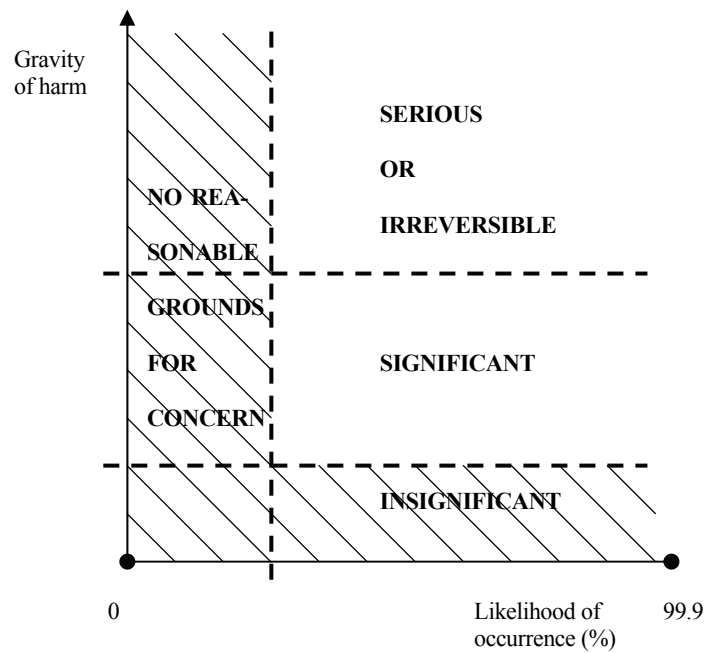


Figure 8. *Proportionality (II)*. The same diagram as in Figure 7, but incorporating the legally relevant threshold lines of ‘reasonable grounds for concern’, ‘significant harm’ and ‘serious or irreversible harm’. These are depicted by dotted lines. Coordinates located within the hatched parts of the diagram represent situations in which precautionary action is not called for.

A practical example is perhaps appropriate here to make it easier to catch on to the essence of all these abstract graphics. In 1990 the American space agency NASA was authorized by the US Congress to perform two costly studies concerning threats posed by near Earth objects (NEOs). The justification given by the Congress for the authorization was that whilst “the chances of the Earth being struck by a large asteroid are extremely small [...] the consequences of such a collision are extremely large [...] so it is only prudent to assess the nature of the threat and prepare to deal with it.”¹⁷⁴ A step by step analysis of this case in terms of the three ingredients of the precautionary principle looks as follows. (1) The gravity of anticipated harm is evidently huge. If the scenario sketched in the above citation were to materialize the damage would be extremely serious and largely irreversible,

¹⁷⁴ Rubin, 2000, pp. 112-113, citing from Morrison, D. (ed.), *The Spaceguard Survey: Report of the NASA International Near-Earth-Object Detection Workshop*, Pasadena 1992, p. 2.

meaning the end for millions of species. (2) The likelihood of this scenario becoming reality, however small, still appears to pass the test of 'reasonable grounds for concern' by being more than purely hypothetical. "We know it will happen; we just don't know when."¹⁷⁵ Its probability thus exceeds the level of mere theoretical possibility and as such obviously incomparable to the goat's milk apocalypse described earlier on in this study. (3) These two values combined constitute, to say the least, a considerable risk, considerable enough to entail a duty of states to take effective and proportionate precautionary measures. Such measures have been taken, *inter alia*, in the form of the NASA studies mentioned above. The precautionary rationale of these measures has been strikingly expressed in a 1995 position paper by the American Institute of Aeronautics and Astronautics:

If some day an asteroid does strike the Earth killing not only the human race but millions of other species as well, and we could have prevented it but did not because of indecision, unbalanced priorities, imprecise risk definition, and incomplete planning, then it will be the greatest abdication in all of human history not to use our gift of rational intellect and conscience to shepherd our own survival, and that of all life on Earth.¹⁷⁶

5.5. Conclusions

This chapter on precautionary action, the third essential ingredient of the precautionary principle, has reflected on the *where*, *when* and *how* of such action. In this final paragraph the main findings concerning these three queries will be succinctly reproduced.

Where? In international law the reach of the precautionary principle is a wide one. Apart from its capacity of general principle of international environmental law, as a part of numerous treaties and general customary international law the precautionary principle has legal implications for the great majority of states. Its scope is all-encompassing in that it applies to the environment as a whole, in furtherance of the objective of sustainable development. This means that the principle's reach covers (a) the environment in all geographic areas, both within and beyond the limits of national jurisdiction; (b) all environmental issue areas, from wastes to wetlands and from acid rain to Antarctic krill; and (c) all human endeavors with environmental implications, all plans, activities, products and technologies, whether existing or new. In all these respects the precautionary principle, as the *Rio Declaration* puts it, is to be "widely applied by states".

¹⁷⁵ Rubin, *ibid.*, p. 111.

¹⁷⁶ Cited in Rubin, *ibid.*, at p. 110.

Precautionary action is appropriate *wherever* there are sufficiently qualified threats of environmental harm.

When? This is the same as asking when there *is* such a sufficiently qualified threat, as defined by the thresholds of gravity and likelihood identified in previous chapters. Concretely, when are there *reasonable grounds for concern* that *significant, serious* and/or *irreversible* environmental *harm* may be caused? Various guidelines exist for determining whether each of these conditions applies. For instance, on a general level, an anticipated environmental impact constitutes harm when the environmental change provoked by it is adverse and not positive or neutral. Likewise, harm is significant when it is tangible, appreciable and measurable, as opposed to minor or trivial – a relatively low threshold to cross. Prominent indicators of gravity are the duration and geographic dispersion of anticipated effects (see Figure 6 above). Frequently assessments will be uncomplicated in the sense that it is plain obvious that the impact at hand is adverse, significant, serious or irreversible. When anticipated harm would constitute a breach of substantive norms of international environmental law then it is surely significant and suspected to be serious as well. When circumstances are not so manifest, valuable clues can many a time be encountered in the shape of formal statements of states in, for example, legal and policy instruments, indicating expressly or implicitly that a certain environmental impact is considered as adverse, significant, serious or irreversible. Sometimes there will even be checklists available specifying what is regarded significant or serious in a particular context. Irreversibility is an apparently unambiguous criterion in that, in principle, harm is either reversible or not. Besides factually irreversible harm, in the context of the precautionary principle the notion includes damage that is practically irreversible in that it is unlikely to be undone in the course of several human generations. Together all these guidelines compose the framework that defines the room ultimately available for discretionary judgments by the authorities involved. The dimensions of this room reserved for subjective determinations and the difficulty of gravity assessments will depend heavily on factual circumstances and will therefore vary from case to case. This is true as much for likelihood as it is for gravity. Assessments of whether there are reasonable grounds for concern are to be informed by the best information available. There is, however, no minimum requirement that this information be scientific or that the risk in question be quantifiable, although it *does* need to amount to more than a mere theoretical hypothesis.

How? Precautionary measures need to “anticipate, prevent and attack the causes of environmental degradation,” as the *Bergen Declaration* specifies. They must be tailor-made to fit the particular threat of environmental harm at hand. To that end they ought to be *effective* on the

one hand and *proportional* on the other. The requisite of effectiveness demands that a course of action is chosen that suits the purpose of protecting that part of the environment which is at risk by effectively preventing or abating the threat in question. The requisite of proportionality demands that a course of action is chosen that corresponds to the size of the risk involved. The graver and/or more likely the anticipated environmental harm – that is, the greater the risk – the more rigorous the response, and the other way around. (See Figures 7 and 8 above.) Finally, when in doubt about what measure(s) to pick, it is in keeping with the precautionary principle to err on the side of environmental protection.