

INTERNATIONAL LAW ASSOCIATION

Study Group on the International Law Commission's Draft Articles on the Law of Transboundary Aquifers

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REPORT

PART ONE

In its 2006 session, the International Law Commission completed its first reading of the *Draft Articles on the Law of Transboundary Aquifers* ("draft articles"). States were invited to comment on these draft articles by January 2008, with a view towards completing a second reading in the Commission's 2008 session. The Commission's work was meant to complement its earlier work that culminated in the *UN Convention on the Law of Law of Non-Navigational Uses of Transboundary Watercourses* ("*UN Convention*"). Today, as much as 90% of human water consumption in some regions comes from aquifers, yet only recently have States realized that aquifer systems are extremely vulnerable and thus apt to easy pollution and exhaustion, and thus the law applicable to aquifers generally and to transboundary aquifers specifically is a relatively recent development. The Commission's work on codifying and progressively developing the law applicable to transboundary aquifers is highly appreciated and greatly commended. These draft articles mark another milestone in articulating the law necessary to the preservation of life on Earth at one of its most important and the most vulnerable points.

Professor Dellapenna convened a study group at the request of Christine Chinkin, the Director of Studies for the International Law Association. The study group met on 1 and 2 December 2007 in Ghent, Belgium to analyze the draft articles. The study group was drawn from the membership of the Water Resources Law Committee that prepared the *Berlin Rules on Water Resources*, approved by the Association in August 2004. Naturally, the study group drew heavily on the *Berlin Rules*, without, however, attempting to substitute the language from the *Berlin Rules* for the draft articles except where, in the judgment of the study group, it appeared to be strictly necessary. The approach of the study group was to attempt to improve upon the draft articles as prepared by the International Law Commission rather than to propose major changes in the draft articles simply because the study group might have drafted the articles differently if working entirely on its own. Several preliminary or general points about the project were agreed to regarding the project, and then the draft articles were discussed article by article. Part one of this report presents the study group's preliminary or general points. Part Two of this report presents the study group's article-by-article analysis with suggested revisions to the draft articles. Part Three of this report sets out the text of the draft articles as they would be revised should all of the suggestions of the study group be accepted.

The most basic general question regarding the draft articles remains their relationship to the *United Nations Convention*. The convention was approved by a vote of 103-3 in the General Assembly in 1997. The work on the *UN Convention* disclosed the need for a codification of the international law pertaining to transboundary aquifers. Moreover, a comparison of the draft articles with the *UN Convention* discloses that the draft articles draw heavily on the convention, without, however, fully replicating the convention. Differences arise in that some provisions included in the convention are not included in the draft articles, and the text of some of the draft articles differs significantly from the text of corresponding articles of the convention. If the draft articles were meant to be a protocol to the *UN Convention*, omissions would be of little consequence, while the differences might be justified to the extent that the characteristics of aquifers differed materially from the characteristics of the waters covered by the convention—watercourses and tributary groundwater. On the other hand, if the draft articles on the law of transboundary aquifers were to be made into a free-standing convention in its own right or even a non-binding international instrument, the draft articles are inadequate to the task. At the very least, the draft articles would have to include provisions on all of the matters covered in the *UN Convention*, a good many of which provisions have simply been omitted from the draft articles. As a stand-alone legal instrument, the draft articles might also consider adding provisions not included in the *UN Convention*, but which are also essential to a fully functioning regime for the regulation and management of transboundary aquifer systems, such as an article on the need for technical and general education regarding groundwater, aquifers, and related matters.

Given the importance of problems relating to transboundary aquifer systems, the resulting concerns should be addressed in the most legally effective manner possible, whatever the Commission concludes that turns out to be. The study group did not attempt to consider why the ratifications of the *UN Convention* have proceeded as slowly as they have. Nor did the study group consider the possibility of drafting an entirely new convention that would combine in a single document the coverage of the *UN Convention* and these draft articles. That does not appear likely to improve the chances of ratification either for the *UN Convention* or, should the General Assembly choose to convert the draft articles into a convention, for the draft articles. The study group, like the International Law Commission thus far in its deliberations, has not attempted to resolve the question of the final form of the draft articles. Yet without resolving that question, the draft articles cannot really be put into a final form ready for consideration by the General Assembly if only because of the question of how to deal with omissions or alterations from the *UN Convention*. At the least, as a stand-alone instrument, the draft articles would, as the Special Rapporteur has noted, need to add one or more articles on the relation of the draft articles to the *UN Convention* in order to ensure that the two instruments can work harmoniously together.

The second general point is that the draft rules, especially if they are to be a free-standing instrument, define their scope too narrowly. The draft articles would govern “transboundary aquifers and aquifer systems” (draft article 1). An “aquifer” is defined as “a permeable water-bearing underground geological formation underlain by a less permeable layer and the water contained in the saturated zone of the formation” (draft article 2(a)), while an “aquifer system” is simply two or more hydraulically connected aquifers (draft article 2(b)). These two concepts, when occurring in a transboundary context, define the scope of the draft articles (draft article 2(c)). These definitions limit the reach of the draft articles to aquifers that themselves underlie two or more countries or that are hydraulically connected to such an aquifer, while excluding both aquifers entirely located within one country that are connected to an international watercourse and aquifers entirely within one country but with discharge or recharge zones in another state. Because of this narrow definition, the draft articles limit the concept of aquifer states (which is the key to rights under the draft articles) to states that overlie a transboundary aquifer as defined in the draft articles. No attention is given to the interconnections of aquifers to surface waters or to their recharge or discharge zones, yet without authority to manage the entire system of hydraulically interconnected waters conjunctively, there is a high risk, sometimes a certainty, that different pieces of these interconnected waters will be managed at cross-purposes to the detriment of all concerned. The resulting problems manifest themselves in draft article 10 (renumbered as article 13) that recognizes duties on States that contain recharge

or discharge zones without overlying any part of the aquifer or aquifer system. This rule could impose significant burdens on a State without recognizing any corresponding rights in the burdened State. The burdened State would not even be entitled to a say in management decisions regarding the aquifer or aquifer system—decisions that will shape the duties on a State containing only a recharge or discharge zone. This seems untenable.

The narrowness of the defined scope of the draft articles would be less of a problem if the draft articles are appended as a protocol to the *UN Convention*, for that convention already addresses the interconnections of aquifers (or more precisely, groundwater) with surface waters, but even then the omission of recharge and discharge zones creates serious problems. Yet even the draft articles were to become a protocol to the *UN Convention*, the limited scope of the draft articles could result in different legal responsibilities regarding transboundary aquifer systems depending on whether a system is covered by the convention or the protocol (the draft articles). The *UN Convention*, by including within its scope “a system of surface waters and groundwater constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus,” arguably extends its reach even to the recharge and discharge zones that are not included within the reach of draft articles as currently drafted, yet the absence of any specific rules in the *UN Convention* directed to groundwater or aquifers could actually mean that groundwater within the scope of the convention might receive a lower level of protection than the protection envisaged in the draft articles. In either case, States would be relegated to the claims under customary international law, such as is summarized in the *Berlin Rules*. The avoidance of disputes over the scope and meaning of the relevant customary international law is one of the major, perhaps the major, purpose of the International Law Commission’s draft articles, but these instruments in fact have left important questions to be resolved under uncodified customary international law.

As will appear in the Part Two of this report, the study group sought to resolve the scope by redefining the concept of an “aquifer system” as including all interrelated aquifers and their hydraulically connected surface waters and their recharge and discharge zones. This would make the coverage of the draft articles suitably comprehensive. It also serves to simplify somewhat the language of the draft articles, for it would no longer be necessary to repeat the formula “transboundary aquifers or aquifer systems,” as appears repeatedly throughout the present draft articles. Instead, the simpler verbal formula “transboundary aquifer system(s)” serves to express the full coverage of an appropriate set of draft articles, one that invites a comprehensive, equitable, reasonable, and sustainable management of transboundary underground water resources.

Finally, transboundary aquifers are especially vulnerable resources. The movement of waters through underground systems is complex, depending on permeability, hydraulic conductivity, porosity, and the hydraulic gradient.¹ The effect of these variables is that water moves underground in unforeseen ways that can only be determined through expensive and time consuming research. Even when the pattern of the underground movement of water is established, it generally moves far more slowly than water on the surface. Thus forces that cause a deterioration of groundwater as a resource (such as overexploitation or pollution) might take considerable time to manifest themselves, particularly at a considerable distance from where the force is introduced, and yet once they manifest themselves it may be too late to do much to protect or restore the resource. In such a setting, the obligations to manage the resource sustainably, to minimize environmental harm, and to use a precautionary approach are foremost among the principles required by customary international law.² The principles receive scant mention in the draft articles. Sustainability is referred to explicitly on in a highly general way in draft article 7 (the general duty to cooperate) (renumber as article 10), while its implementation is addressed in a highly allusive manner in draft article

¹ See generally JOSEPH W. DELLAPENNA, 3 WATERS AND WATER RIGHTS § 18.02 (Robert E. Beck ed. 2003 replacement ed.).

² See *Berlin Rules* arts. 7, 8, 23, 38, 40, 41 (ILA 2004).

4 (equitable and reasonable utilization) (renumbered as article 7). The obligation to minimize harm is mentioned only in draft articles 10 (recharge and discharge zones) (renumber as article 13) and 15 (scientific and technical cooperation) (renumber as draft article 20), both of which are of extremely limited in their application. The precautionary approach is mentioned only in draft article 11 (pollution) (renumber as article 14), although precaution is essential in all aspects of the management of transboundary aquifer systems, properly defined.

The study group proposes that the obligations to manage the resource sustainably, to minimize environmental harm, and to use a precautionary approach be reformulated, consistently with their current status in customary international law,³ as general principles of law applicable to transboundary aquifers systems generally in Part II of the draft articles. The study group also propose to recognize in the article on sustainability that in order to balance the needs of current and future generations, sustainability necessary implies recognition of the right of potentially affected persons and communities to participate in the decision making process relating to transboundary aquifer systems.

In Part Three of this report, the entire text of the first reading of the draft articles is set forth, with indications proposed changes in the text where the study group felt changes were necessary. Brief commentaries are provided wherever changes are proposed in order to explain the reasons for the proposed change and to explore some of the consequences of introducing the proposed changes.

PART TWO

DRAFT ARTICLES ON THE LAW OF TRANSBOUNDARY AQUIFERS

INTRODUCTION

PART I.

Article 1.

Scope

The present draft articles apply to:

- (a) utilization of transboundary aquifers and aquifer systems;**
- (b) other activities that have or are likely to have an impact upon those aquifers and aquifer systems; and**
- (c) measures for the protection, preservation and management of those aquifers and aquifer systems.**

Commentary: This scope is significantly broader than the scope of the *UN Convention* because it includes activities that are likely to have an impact on aquifers, language for which there is no analogue in the *UN Convention*. On the other hand, the language is too narrow because of the narrow definition of “aquifer” and “aquifer system” as discussed in Part One of this report. The study group favors the broad coverage of this draft article, but would alter the language to be consistent with the study group’s proposed redefinition of an “aquifer system.” The reasons for the proposed redefinition are discussed further in connection with draft article 2(b).

Article 2.

Use of terms

For the purposes of the present draft articles:

³ *Id.*

(a) “aquifer” means a permeable water-bearing underground geological formation underlain by a less permeable layer and the water contained in the saturated zone of the formation;

Commentary: Nowhere is the term “groundwater” defined, nor is the term used within the draft articles. The definition of “aquifer” therefore is the central definition determining the reach of the draft articles. The definition includes both the geological formation in which groundwater is found and the water within the saturated zone of the formation. The definition in the *Berlin Rules* is somewhat different: “‘Aquifer’ means a subsurface layer or layers of geological strata of sufficient porosity and permeability to allow either a flow of or the withdrawal of usable quantities of groundwater.”⁴ The definition in the draft articles, in contrast with the *Berlin Rules*, omits whether the water-bearing formation is capable of producing usable quantities of water. The Commission’s approach might be preferable to the *Berlin Rules* formulation because it extends the scope of the draft articles to all “water-bearing underground geological formations,” including formations that could become exploitable in the future even if they are not capable of producing exploitable quantities of water at this time. There is no comparable definition in the *UN Convention*, which focuses on surface waters and includes groundwater only to the extent that it is, as it were, tributary to a surface watercourse.⁵

(b) “aquifer system” means ~~a series of two~~ one or more aquifers and its or their recharge and discharge zones that are as well as hydraulically connected surface waters;

Commentary: This definition recognizes that groundwater resources often occur within a hydrogeological network of interrelated resources. The original definition fails to include the full range of related structures by omitting recharge and discharge zones, both of which are essential components of an aquifer system. Recharge and discharge zones are vital to the protection, preservation, and management of an aquifer.⁶ This exclusion severely compromises the utility of the draft articles. A State in the territory of which a recharge or discharge zone is located, but under which no part of the aquifer lies, is a non-aquifer State, with no rights under the draft articles, while an aquifer entirely within a single State but with recharge and discharge zones in whole or in part in another State, is not within the scope of the draft articles.⁷ The Commission sought to resolve this problem by imposing duties on States that include recharge or discharge zones but do not overlie the aquifer as such. *See* draft article 10(2) (renumbered as article 13(2)). It seems unlikely that States that the draft articles would subject to duties to protect a recharge or discharge zone with no say in the overall protection, preservation, and management of the aquifer will be willing to incur substantial burdens with no reciprocal benefits to themselves.⁸ The scope of the rights and duties under the draft articles should extend to all States in which activities will have a substantial impact on the aquifer, with their rights and duties subject to balancing to achieve a reasonable and equitable pattern of use. This could best be achieved by amending the definition of an “aquifer system”

⁴ *Id.*, art. 3(2).

⁵ *UN Convention*, art. 2(a).

⁶ *See* Gabriel E. Eckstein, *Protecting a Hidden Treasure: The UN International Law Commission and the International Law of Transboundary Ground Water Resources*, 5 SUSTAINABLE DEV. L. & POL’Y 5, 7 (2005) (“Most hydrogeologic texts define an aquifer in terms of its potential for storing, transmitting and producing water in usable quantities. The recharge and discharge zones are mere extensions of the aquifer that could, if saturated, achieve these criteria.... From a hydrogeologic perspective, protection of the recharge and discharge zones is crucial to the protection of the aquifer because of the prominent causal relationship between what occurs in the two zones and the health of the aquifer.”). *See generally* DELLAPENNA, *supra* note 1, §§ 18.02, 18.03(a).

⁷ Gabriel E. Eckstein, *Commentary on the U.N. International Law Commission’s Draft Articles on the Law of Transboundary Aquifers*, 18 COLO. J. INT’L ENVTL. L. & POL’Y 539, 549 (2007).

⁸ *Id.*, at 585-89.

rather than of an “aquifer.” Neither the *Berlin Rules* nor the *UN Convention* defines an “aquifer system,” so including a proper definition of this concept in the draft articles would be an important step forward. The current definition in the draft article 2(b), however, misses the point entirely and should be rewritten. If the definition is rewritten as proposed, the continual reference throughout the draft articles to “aquifer or aquifer system” should be simplified to a reference simply to an “aquifer system” as that would encompass both the aquifer and its hydrogeologically related systems.

(c) ~~“transboundary aquifer” or “transboundary aquifer system” means, respectively, an aquifer or aquifer system, parts of which are situated in different States;~~

Commentary: This definition parallels the definition of an international watercourse in the *UN Convention*: “a watercourse, parts of which are situated in different States.” The definition precludes the application of the draft articles to an aquifer system that is hydrologically connected to an international watercourse unless the aquifer or aquifer system itself is situated in more than one State, perhaps in an attempt to avoid overlap with the *UN Convention*. On the other hand, an aquifer system that connects to a wholly domestic watercourse would still be within the scope of these draft articles if the aquifer system traversed an international boundary.⁹ The crucial point, captured in the comparable definition in the *Berlin Rules*,¹⁰ is actually whether any part of the aquifer system is part of an international drainage basin, regardless of whether the basin operates on the surface basin or below the surface of the land. If the draft articles are meant to supplement the *UN Convention*, no mention of any connection to an international watercourse would be necessary. If the draft articles are meant to become a free-standing instrument without a redefinition of an “aquifer system,” one might add at the end of this section the following: “or which is hydraulically connected to watercourses that are situated in different States.”.

(d) ~~“aquifer State” means a State in whose territory any part of a transboundary aquifer or aquifer system is situated;~~

Commentary: This definition parallels the definitions in the *UN Convention* and the *Berlin Rules*.¹¹ Apart from omitting the redundant reference to a “transboundary aquifer,” no change is necessary.

(e) ~~“recharging aquifer” means an aquifer that receives a non-negligible amount of contemporary water recharge;~~

(f) ~~“recharge zone” means the zone which contributes water to an aquifer, consisting of the catchment area of rainfall water and the area where such water flows to an aquifer by runoff on the ground and infiltration through soil;~~

(g) ~~“discharge zone” means the zone where water originating from an aquifer flows to its outlets, such as a watercourse, a lake, an oasis, a wetland, or an ocean;~~

(h) ~~“emergency” means a situation, whether resulting suddenly from natural causes or from human conduct, that poses an imminent threat of causing serious harm to an Aquifer system or to aquifer States or other States.~~

⁹ *Id.*, at 554-56.

¹⁰ *Berlin Rules*, art. 42(1): The Rules applicable to internationally shared waters apply to an aquifer if:

- It is connected to surface waters that are part of an international drainage basin; or
- It is intersected by the boundaries between two or more States even without a connection to surface waters that form an international drainage basin.

¹¹ *UN Convention*, art. 2(c); *Berlin Rules*, art. 3(3).

Commentary: The last definition has been moved here from draft article 16(1) (renumbered as article 19). The study group has altered the text in draft article 16(1) by eliminating the requirement of suddenness. Some emergencies emerge over a significant period of time, yet they are not less exigent for it.¹² The definition has also been rephrased to indicate that it includes emergencies that create a risk of harm to an aquifer system as broadly redefined in this report.

PART II.

GENERAL PRINCIPLES

Article 3.

Sovereignty of aquifer states

Each aquifer State has sovereignty over the portion of a transboundary aquifer or aquifer system located within its territory. It shall exercise its sovereignty in accordance with the present draft articles.

Commentary: While reaffirmation of sovereignty could be seen as a revival of the Harmon doctrine, at least for groundwater, the second sentence clearly counters such a possibility, indicating that a State's sovereignty over an aquifer or aquifer system is limited by the obligations established in international law. These obligations particularly include the principles of sustainability, the precautionary approach, the minimization of environmental harm, equitable utilization, the avoidance of significant transboundary harm, and the obligation to monitor the aquifer system and to exchange data regarding such systems.

Article 4. **Sustainability**

- 1. States shall give effect to the principle of sustainability in protecting, preserving, and managing aquifer systems, taking into account natural and artificial recharge.**
- 2. In withdrawing water from an aquifer, sustainability at the least requires:**
 - a. the participation of affected persons and communities in decisions affecting aquifers on which their well-being or ecosystems depends;**
 - b. in utilizing a non-recharging transboundary aquifer system, aquifer States shall aim at maximizing the long-term benefits derived from the use of the water contained therein;**
 - c. in utilizing a recharging transboundary aquifer system, aquifer States shall not utilize the aquifer system at a level greater than the recharge rate, although exceptional circumstances may justify temporarily exceeding recharge rates subject to later recharge.**

Commentary: The draft articles do not mention the principle of sustainability except in passing in draft article 7(1) (renumbered as article 10(1)). The principle nevertheless underlies the proposed treatment of recharging aquifers in draft article 4(d) (renumbered as article 7), apparently as a limit on the principle of “maximizing the long-term benefits derived from the use of the water contained” in the aquifer in draft article 4(b) (renumbered as article 7). The provision does not expressly adopt any standard for non-recharging aquifers, presumably leaving non-recharging aquifers to the general standard of the maximization of long-term benefits. Even for recharging aquifers, the draft articles do not limit extractions, even as an average over a period of years, to natural or artificial recharge, which some will see as negating the principle of sustainability. Moreover, simple overexploitation could transform a recharging aquifer from a renewable to a

¹² See Eckstein, *supra* note 7, at 602-03.

non-renewable resource. The limit provided is that exploitation shall not “prevent the continuance of its effective function, but just what is the “function” of an aquifer? To provide water for 20 years? Or something else? What relevance is to be given to the impact of such withdrawals on dependent ecosystems? Customary international law actually imposes a clear and rather strong duty to exploit all resources, including aquifers, sustainably. This duty is recognized in both the *UN Convention* and the *Berlin Rules*.¹³ The *Berlin Rules* expressly recognizes the application of the principle of sustainability to groundwater¹⁴ as do numerous international agreements already in effect.¹⁵

The study group proposes a new article 4 that would express a strong commitment to the principle of sustainability, with, for recharging transboundary aquifer systems, any withdrawals in excess of the natural or artificial recharge justified only because of emergency situations or situations of extraordinary water scarcity. This would be done in the proposed article 4(1).¹⁶ Proposed article 4(2) would then analyze the application of the principle to particular aquifers. It begins by recognizing the need to provide for the participation of affected persons and communities in making decisions about the use of water. The need to balance the needs and interests of present and future generations implies as much, as was recognized in the *New Delhi Declaration* of 2002.¹⁷ Without such participation, there is likely to be resistance to measures intended to ensure sustainability as well as failure to fully gage the needs and interested of the persons and communities.

The remaining provisions present more specific standards for recharging and non-recharging aquifers. For recharging aquifers, the application is fairly obvious: Withdrawals should normally not exceed the recharge rate, whether recharge is natural or artificial. Proposed article 4(2)(b) expresses this requirement while also recognizing that certain exceptional circumstances, such as a severe drought, could justify temporarily exceeding the recharge rate. The application of the primary obligation of not exceeding the recharge rate would require that any temporary overexploitation be made up when the exceptional circumstances are over. For non-recharging aquifers, the application of the principle of sustainability is more difficult, for any withdrawals will necessary diminish the aquifer. Such non-recharging aquifers should be treated the same way as any other depletable resource: Its exploitation should be done in a fashion that aims to maximize long-term benefits. While the proposed article 4(2)(c) does not spell out the full significance of the principle of sustainability, the application of that principle to depletable resources requires that the resource not be exhausted without making arrangements for a sustainable substitute—an obligation of critical importance for a resource as critical to human survival and thriving as water. In other words, the question is what would a responsible *pater familias* do in providing for the welfare of the family.

Article 5.

The Precautionary Approach

¹³ *UN Convention*, art. 5(1); *Berlin Rules*, arts. 7, 40.

¹⁴ *Berlin Rules*, art. 40.

¹⁵ See, e.g., *Danube River Convention* (1994), art. 2; *Interim Agreement on the Incomati and Maputo Watercourses* (2002), arts. 1, 3(a); *Luso-Spanish Convention* (1997), arts. 2, 4; *Sava Framework Convention* (2002), arts. 1(2), 2(1)(b), 9.

¹⁶ Cf. *Berlin Rules*, art. 40(1): “States shall give effect to the principle of sustainability in managing aquifers, taking into account natural and artificial recharge.”

¹⁷ *New Delhi Declaration on Sustainable Development* (2002), principle 5. See also *Bonn Declaration* (2001), recommendation 1 (2001); *Dublin Statement on Sustainable Development* (1992), art. 2.

In view of uncertainty about the nature and extent of aquifer systems and of their special vulnerability to detrimental impacts from human activity, aquifer States shall take a precautionary approach.

Commentary: The only reference to the precautionary approach in the draft articles appears in draft article 11 (renumbered as article 14). In draft article 11, the precautionary approach is mentioned in connection with pollution. Given the special vulnerabilities of aquifers to contamination, overexploitation, the lowering of water tables, subsurface subsidence, and other problems,¹⁸ the precautionary approach should not be limited only to pollution. It should be a general principle applicable throughout the draft articles, applying to aspects of groundwater management. The study group therefore proposes this article in order to add the precautionary approach as a general principle in Part II, rather than leaving it relegated to draft article 11. A more complete discussion of the need for the precautionary approach is provided in the introduction to this report.¹⁹

The particular phrasing of this article, which is taken without change from the original draft article 11, emphasizes the reasons for the importance of taking a precautionary approach.²⁰ Given that the precautionary approach is in fact a general requirement of international environmental law,²¹ this principle might be stated without any introductory language: “Aquifer States shall take a precautionary approach.” In any event, it should be made clear, at least in the commentary that the introductory language is not meant to limit the obligation to use the precautionary approach to those matters referred to in this article.

Article 6

States shall take all appropriate measures to prevent or minimize environmental harm.

Commentary: Several draft articles express the obligation to minimize environmental harm. The study group proposes to recognize this as a general principle. The principle underlies numerous international environmental treaties, often being expressed in similar or identical terms. Draft article 11 (renumbered as draft article 14) expresses this obligation clearly with regard to pollution, but the obligation is more general than just pollution. The study group took this language from the *Berlin Rules*.²² The principle finds support in several articles of the *UN Convention*,²³ as well as numerous multilateral, regional, and bilateral agreements.²⁴

Article 74.

¹⁸ See generally DELLAPENNA, *supra* note 1, §§ 18.02 to 18.05.

¹⁹ See page 3.

²⁰ Cf. *Report of the Committee on Water Resources Law*, in REPORT OF THE SEVENTY-FIRST CONFERENCE OF REPORT OF THE SEVENTY-FIRST CONFERENCE OF THE INTERNATIONAL LAW ASSOCIATION (HELD IN BERLIN, 2004), at 335, 387 (2005) (“... rapidly falling water tables might not appear until some years after a serious overdraft begins, by which time it might be too late to do much about it.”).

²¹ See *Berlin Rules*, art. 23.

²² *Id.*, art. 8. See also *id.*, arts. 22 to 35. See generally *New Delhi Declaration* (2002), prs. 1.1, 1.3. 3.1.

²³ *UN Convention*, arts. 5(1), 7(1), 20, 21(2), 23, 27, 28(3).

²⁴ See, e.g., *African Convention on the Conservation of Nature and Natural Resources*, arts. II(1), VII(1); *Agreement Establishing the World Trade Organization*, preamble (1994); *ASEAN Convention on the Conservation of Nature*, arts. 1(1), 14(1), (2), 20(2) (1985); *Basel Convention on the Movement of Transboundary Wastes*, art. 4(2)(a) (1989); *Convention on Long-Range Transboundary Air Pollution*, art. 2 (1979); *Convention on the Protection of the Alps*, art. 2(1) (1991); *Espoo Convention*, art. 2(1) (1991); *Helsinki Convention*, art. 2(1), (2) (1992); *La Plata Treaty*, arts. 48, 49 (1973); *Luso-Spanish Convention*, art. 10(1)(b) (1997); *Mekong Agreement*, arts. 1, 7 (1994); *Protocol of San Salvador*, art. 12(2) (1988); *UN Convention on the Law of the Sea*, arts. 192, 194(1), 207(1), (4) (1982); *Vienna Convention on Protection of the Ozone Layer*, art. 2(1) (1985). See also *Rio Declaration*, prs. 2, 4, 7 (1992).

Equitable and reasonable utilization

Aquifer States shall utilize a transboundary ~~aquifer or~~ aquifer system according to the principle of equitable and reasonable utilization having due regard to the avoidance of significant harm to other aquifer States as follows:

- (a) they shall utilize the transboundary ~~aquifer or~~ aquifer system in a manner that is consistent with the equitable and reasonable accrual of benefits therefrom to the aquifer States concerned; and
- ~~(b) they shall aim at maximizing the long-term benefits derived from the use of water contained therein;~~
- ~~(be) they shall establish individually or jointly an overall utilization plan, taking into account present and future needs of, and alternative water sources for, the aquifer States; and~~
- ~~(d) they shall not utilize a recharging aquifer or aquifer system at a level that would prevent continuance of its effective functioning.~~

Commentary: This draft article is broadly consistent with the customary international law of water resources, but contains several significant problems.²⁵ The study group would add to the chapeau a reference to the obligation to avoid significant harm to other aquifer states. This follows the language of the *Berlin Rules*²⁶ and serves to emphasize that the basic principles of equitable and reasonable utilization and of the avoidance of harm both need to be considered in the resolution of any dispute regarding a transboundary aquifer. Paragraphs (b) and (d) of draft article 4 (renumbered as draft article 7) relate to the application of the principle of sustainability to groundwater. They have been moved to a proposed new article 4 for reasons explained after that proposed article, primarily to emphasize their central importance to the management of groundwater. The remaining points express the obligation of equitable and reasonable utilization that forms one of the core principles of the customary international law of water resources.²⁷

Article 85.

Factors relevant to equitable and reasonable utilization

1. Utilization of a transboundary ~~aquifer or~~ aquifer system in an equitable and reasonable manner within the meaning of draft article 74 requires taking into account all relevant factors, including:
 - (a) the population dependent on the ~~aquifer or~~ aquifer system in each aquifer State;
 - (b) the social, economic and other needs, present and future, of the aquifer States concerned;
 - (c) the natural characteristics of the ~~aquifer or~~ aquifer system;
 - (d) an aquifer State's physical access to the waters in the aquifer system;
 - ~~(d) the contribution to the formation and recharge of the aquifer or aquifer system;~~
 - (e) the existing and potential utilization of the ~~aquifer or~~ aquifer system;
 - (f) the actual and potential effects of the utilization of the ~~aquifer or~~ aquifer system in one aquifer State on the other aquifer States concerned;
 - (g) the availability of alternatives to a particular existing and planned utilization of the ~~aquifer or~~ aquifer system;

²⁵ Cf. *Id.*, arts. 6, 10; *Berlin Rules*, arts. 13, 14.

²⁶ *Berlin Rules*, art. 12(1).

²⁷ See *UN Convention*, art. 5(1); *Berlin Rules*, arts. 12, 42(4).

(h) the development, protection and conservation of the ~~aquifer or~~ aquifer system and the costs of measures to be taken to that effect;

(i) the role of the ~~aquifer or~~ aquifer system in the related ecosystem.

2. The weight to be given to each factor is to be determined by its importance with regard to a specific transboundary ~~aquifer or~~ aquifer system in comparison with that of other relevant factors. In determining what is equitable and reasonable utilization, all relevant factors are to be considered together and a conclusion reached on the basis of all the factors. However, in weighing different utilizations of a transboundary ~~aquifer or~~ aquifer system, ~~special regard shall be given to vital human needs~~ shall not be compromised.

Commentary: As originally provided in this draft article, there was a contradiction in counting “the contribution to the formation and recharge of the aquifer or aquifer system” as relevant to determining whether there is an equitable and reasonable utilization (draft article 5(1)(d)) and not treating States in which the recharge and discharge zones are located as aquifer States (draft article 2(d)). The study group’s proposed redefinition of an “aquifer system” makes clear that this article applies to all States with a genuine link to a transboundary aquifer system. Nonetheless, the study group proposes eliminating the express reference to an aquifer State’s contribution to the formation and recharge of the aquifer system on the grounds that this factor is already included within the “natural characteristics of the aquifer system” as provided in draft article 5(1)(c) (renumbered as article 8(1)(c)). In order to accommodate further the redefinitions proposed by the study group, we have proposed a new draft article 8(1)(d) that would take into account the physical capacity of an aquifer State to access the waters of the aquifer system, something that might be limited for a State that contains a recharge zone but no actual physical access to the aquifer as such.

The list of the relevant variables does not appear to recognize the speed with which changes in an aquifer system are transmitted throughout the system, which is much slower than through a surface water system (a watercourse).²⁸ Draft article 5(1)(f) (renumbered as article 8(1)(f)) thus should expressly recognize the importance of potential effects rather than, as it arguably does, limit attention to actual (present) effects. This change by itself might not be enough, for nothing in the draft article recognizes the frequent interconnection of aquifers to watercourses whereby the protection, preservation, and management of an aquifer can impact on States far removed from the aquifer system itself, even broadly defined, and vice versa. The study group proposes to remedy this problem by enlarging the concept of “aquifer system” as defined in draft article 2.

Finally, this draft article follows the language of the *UN Convention* regarding “vital human needs.”²⁹ The study group is of the opinion that the language could be made stronger consistently with customary international law, as provided in the *Berlin Rules*.³⁰ The language proposed the last sentence in paragraph 2 also reflects the growing recognition of a right to water without getting into the often intense debate over the detailed content of such a right.

Article 96.

Obligation not to cause significant harm to other aquifer States

1. Aquifer States shall, in utilizing a transboundary ~~aquifer or~~ aquifer system in their territories, take all appropriate measures to prevent the causing of significant harm to other aquifer States having due regard to the right of each aquifer State to make an equitable and reasonable utilization of the waters of the system.

²⁸ Cf. *Report of the Committee on Water Resources Law*, quoted *supra* at note 20.

²⁹ *UN Convention*, art. 10(1).

³⁰ *Berlin Rules*, art. 14(1).

2. ~~Aquifer States shall, in undertaking activities other than utilization of a transboundary aquifer or aquifer system that have, or are likely to have, an impact on that transboundary aquifer or aquifer system, take all appropriate measures to prevent the causing of significant harm through that aquifer or aquifer system to other aquifer States having due regard to the right of each aquifer State to make an equitable and reasonable utilization of the waters of the system.~~
3. ~~Where significant harm nevertheless is caused to another aquifer State, the aquifer States whose activities cause such harm shall take, in consultation with the affected State, all appropriate measures to eliminate or mitigate such harm, having due regard for the provisions of draft articles 4 and 5.~~

Commentary: This article does not consider whether a more stringent standard than “significant harm” is called for because of the peculiar vulnerability of aquifer systems. Neither the *UN Convention* nor the *Berlin Rules* provide such an alternative standard,³¹ while the concept of “significant harm” is perhaps flexible enough to allow different standards to be applied to aquifer systems when appropriate. This illustrates the complexities hidden in the apparently simple commands regarding the avoidance of harm.³² Paragraph 2 of this draft article reflects the extension of the scope of these articles compared to the *UN Convention* to activities likely to impact on a transboundary aquifer system (draft article 1(b)). This obligation does not, however, reach activities in “non-aquifer States” that contain recharge and discharge zones but do not overlie the aquifer. By redefining “aquifer State,” the study group would resolve the resulting problems in defining and enforcing such a duty.

Although paragraph 3 as originally proposed more or less parallels a comparable provision of the *UN Convention*,³³ the study group is of the opinion that it would better be eliminated. Paragraph 3 addresses the legal remedies for a violation of this draft article. No other article addresses the legal remedies available for its violation, and it would be better to treat this draft article identically with the other draft articles in this regard. The problematic nature of addressing legal remedies in this fashion is suggested by the discarding in the draft articles of the language in the comparable provision of the *UN Convention* referring to the possibility of compensation as an appropriate method for dealing with or restoring an equitable balance among aquifer States.³⁴ Earlier drafts, following the text of the comparable provision of the *UN Convention* did refer to the possibility of compensation. While the Commission’s working group on the draft articles promised to bring forward an additional article on compensation generally,³⁵ it never did so. Whether this was done for fear that mentioning the possibility of compensation could lead to an inference that aquifers are so special because of their peculiar vulnerabilities that the obligation to avoid significant harm to another aquifer State cannot be reduced to a mere duty to pay compensation or for some other reason, the entire paragraph here should be dropped. In dropping it, the obligation to have due regard to the principle of equitable and reasonable utilization needs to be preserved. The study group does so by moving that language up into both paragraph 1 and paragraph 2.

Article 107.

General obligation to cooperate

³¹ *UN Convention*, art. 7; *Berlin Rules*, arts. 16, 42(6).

³² See Eckstein, *supra* note 7, at 569-76.

³³ *UN Convention*, art. 7(2).

³⁴ *Id.*

³⁵ Int’l L. Comm’n, Working Group on Shared Natural Resources, *Report of the Working Group*, UN Doc. A/CN.4/L.681 (July 28, 2005), at 4.

1. **Aquifer states shall cooperate on the basis of sovereign equality, territorial integrity, sustainability, mutual benefit and good faith in implementing their obligations relating to transboundary aquifer systems under international law. ~~order to attain equitable and reasonable utilization and appropriate protection of their transboundary aquifer or aquifer system.~~**
2. **For the purpose of paragraph 1, aquifer States shall, as appropriate, ~~should~~ establish joint or coordinated mechanisms of cooperation, such as:**
 - (a) management institutions (article 16);**
 - (b) monitoring (articles 15, 17);**
 - (c) databases (article 11(5));**
 - (d) environmental impact assessments (article 17(2));**
 - (e) communication, warning, and alarm systems (article 19(2));**
 - (f) contingency plans for harmful conditions and emergencies (article 19(3));**
 - (g) research and development (article 20); and**
 - (h) mutual assistance (articles 19(2), 20).**

Commentary: This draft article captures the essential duties of aquifer States to cooperate in the management of a transboundary aquifer system.³⁶ The language of paragraph 1 has been simplified by a general reference to duties under international law. Such a general reference covers all of the specific references in the original language to “equitable and reasonable utilization and appropriate protection,” but also takes in all other relevant duties without having to mention every conceivable duty explicitly. This eliminates the possibility that other possible duties are foreclosed by the language of this draft article. The importance of cooperative or even joint protection, preservation, and management of an aquifer system should be spelled out in more detail. This is done by providing a summary list of the more salient forms of cooperative or joint action. Paragraph 2 provides a road map to the forms such cooperation should, at a minimum, take. For these forms of cooperation, other sections provide more specific indications of when and how such cooperation is to occur. Cross references highlight the relevant articles. See also the commentary to draft article 13 (renumbered as draft article 16).

Article 118.

Regular exchange of data and information

1. **Aquifer States shall, on a regular basis, exchange readily available data and information on the condition of the transboundary ~~aquifer or~~ aquifer systems, in particular of a geological, hydrogeological, hydrological, meteorological and ecological nature and related to the hydrochemistry of the ~~aquifer or~~ aquifer system, on the utilization of the systems, and on other activities that have or are likely to have an impact on those systems, and on measures to protect, preserve, or manage those systems, as well as related forecasts.**
2. **Where knowledge about the nature and extent of some transboundary ~~aquifer or~~ aquifer systems is inadequate, aquifer States concerned shall employ their best efforts to collect and generate more complete data and information relating to such aquifer or aquifer systems, taking into account current practices and standards. They shall take such action individually or jointly and, where appropriate, together with or through international organizations.**

³⁶ *UN Convention*, art. 8; *Berlin Rules*, arts. 7, 11, 38.

3. **If an aquifer State is requested by another aquifer State to provide data and information relating to ~~an~~ ~~the~~ ~~aquifer~~ ~~or~~ ~~aquifer~~ systems that are not readily available, it shall employ its best efforts to comply with the request. The requested State may condition its compliance on payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information.**
4. **Aquifer States shall, where appropriate, employ their best efforts to collect and process data and information in a manner that facilitates their utilization by the other aquifer States to which such data and information are communicated.**
5. **In addition to the implementation of joint monitoring and assessment programs under draft articles 13 and 15, aquifer States shall, where appropriate, create joint institutional mechanisms for collecting, generating, processing, assessing, analyzing, updating, disseminating, and publishing data and information relative to a transboundary aquifer system, including the creation and maintenance of a comprehensive and unified database on such system.**

Commentary: This draft article parallels comparable rules set forth in the *UN Convention* and developed in the *Berlin Rules*.³⁷ The duty to monitor and exchange data applies to all aquifer States, regardless of whether they utilize the aquifer system or not. As drafted, however, the draft article limits the obligation to exchange data and information to the (presumably natural) condition of the aquifer or aquifer system. Data relating to uses and other activities affecting aquifer systems and their impact are covered by draft article 14 (renumbered as article 17). Draft article 14, however, only obliges an aquifer State to exchange data and information when the aquifer State within which the activity will occur has reasonable grounds to believe that the activity may result in significant transboundary harm to another aquifer State. There is no obligation to exchange information or to consult regarding existing activities or planned measures generally. *See* draft article 14(2) (renumbered as article 17(2)). This obligation is too restricted in both aspects. One cannot evaluate planned measures without full information regarding existing activities, and another aquifer State or persons within another aquifer State might very well anticipate significant transboundary harm even though the State within which the activity is to occur does not anticipate such harm. The exchange of data and information should be as wide and as frequent as possible, and not limited to planned measures or the natural condition of an aquifer system. Such a broad obligation is consistent with the scope of the draft articles as defined in draft article 1: the utilization of transboundary aquifers and aquifer systems, other activities that have or are likely to have an impact upon those aquifers or aquifer systems, and measures for the protection, preservation, and management of aquifers or aquifer systems. Moreover, this draft article should include a provision for the creation of a joint data base, perhaps managed and maintained by a joint body as the best way to share data and information.³⁸ The study group therefore proposes this in a new paragraph 5.

PART III.

PROTECTION, PRESERVATION AND MANAGEMENT

Article 129.

Protection and preservation of ecosystems

Aquifer States shall take all appropriate measures to protect and preserve ecosystems within, or dependent upon, their transboundary ~~aquifers~~ ~~or~~ aquifer systems, including measures to ensure

³⁷ *UN Convention*, art. 9; *Berlin Rules*, arts.42(3), 56(1) to (4).

³⁸ *See, e.g.,* Robert D. Hayton & Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 688-89 (1989).

that the quality and quantity of water ~~retained in the aquifer or aquifer system, as well as that released in its discharge zones,~~ are sufficient to protect and preserve such ecosystems.

Commentary: After making the language of this draft article consistent with the expanded definition of an “aquifer system,” it is consistent with the requirements of customary international law.³⁹

Article 130.

Recharge and Discharge Zones

1. ~~Aquifer States shall, individually and, where appropriate, jointly, identify recharge and discharge zones of their aquifer or aquifer systems and, within these zones, shall take special measures to prevent, minimize, and control, and, to the extent practicable, eliminate detrimental impacts on the recharge and discharge processes.~~
2. ~~All States in whose territory a recharge or discharge zone is located, in whole or in part, and which are not aquifer States with regard to that aquifer or aquifer system, shall cooperate with the aquifer States to protect the aquifer or aquifer system.~~

Commentary: With the study group’s proposed redefinition of an “aquifer system,” the second paragraph becomes unnecessary. Paragraph 1 contains the real meat of this draft article.⁴⁰ Its language has been strengthened by adding an express reference to the possibility of eliminating detrimental impacts. This change precludes the argument that some level of detrimental impact is always acceptable.⁴¹

Article 141.

Prevention, reduction and control of pollution

~~Aquifer States shall, individually and, where appropriate, jointly, prevent, minimize, reduce and control, and, to the extent practicable, eliminate pollution of their aquifer or aquifer system, including through the recharge process, that may cause significant harm to other aquifer States. In view of uncertainty about the nature and extent of aquifers or aquifer systems and of their vulnerability to pollution, aquifer States shall take a precautionary approach.~~

Commentary: The language in this draft article parallels the comparable language in the *UN Convention*.⁴² Unlike the *Berlin Rules*,⁴³ this draft article makes no mention of the possibility of eliminating pollution where possible or appropriate. The study group proposes recognizing such a possibility in order to preclude the argument that some level of pollution is always acceptable. The precautionary approach has been moved to a proposed new article 4 as a general principle governing all management decisions related to transboundary aquifers.

³⁹ *UN Convention*, arts. 20, 23; *Berlin Rules*, arts. 8, 22, 41(1).

⁴⁰ *Cf. Berlin Rules*, arts. 37, 42(5) (on the obligations of States sharing groundwater resources to cooperate in the management of the resource).

⁴¹ *Cf. Berlin Rules*, arts. 8 (on the obligation of States to minimize environmental harm), 23 (recognizing the possibility of eliminating harm as within the scope of the precautionary approach), 27(1) (recognizing the possibility of eliminating pollution as within the obligation of a State to control pollution), 41(1), (2) (same, as applied to groundwater).

⁴² *UN Convention*, art. 21(2).

⁴³ *Berlin Rules*, arts. 27(1), 41(1), (2).

Article 152.

Monitoring

1. **Aquifer States shall monitor their transboundary ~~aquifer or~~ aquifer system. They shall, wherever possible, carry out these monitoring activities jointly with other aquifer States concerned and, where appropriate, in collaboration with the competent international organizations. Where, however, monitoring activities are not carried out jointly, the aquifer States shall exchange the monitored data among themselves.**
2. **Aquifer States shall use agreed or harmonized standards and methodology for monitoring their transboundary ~~aquifer or~~ aquifer systems and, ~~They should~~ identify key parameters that they will monitor based on an agreed conceptual model of the ~~aquifer or~~ aquifer system. They shall include parameters on the condition of the aquifer or aquifer system, on the utilization of the system, on other activities that have or are likely to have an impact on the system, and on measures to protect, preserve, or manage the system, as listed in article 118, paragraph 1, and also on the utilization of the aquifer and aquifer system.**

Commentary: The first paragraph of this draft article requires only a slight cleansing of the language to reflect the broader definition of an “aquifer system.” The second paragraph, consistent with the broad scope of these draft articles, has been strengthened by making explicit the full range of information that is to be monitored—an under draft article 8(1) (renumbered as draft article 11), exchanged on a regular basis. This includes information about the effects of and impacts on uses of the system.⁴⁴

Article 163.

Management

Aquifer States shall establish and implement plans and programs for the proper management of their transboundary ~~aquifer or~~ aquifer systems in accordance with the provisions of the present draft articles. They shall, at the request by any of them, enter into consultations concerning the management of a ~~the~~ transboundary aquifer ~~or~~ aquifer system. A joint mechanism shall be established, wherever appropriate.

Commentary: As originally drafted, this draft article goes beyond the provision of article 7 (renumbered as article 11). Draft article 7 merely indicates that aquifer States *should* establish joint mechanisms of cooperation. This draft article indicates that aquifer States *shall, wherever appropriate*, establish joint mechanisms of cooperation and implement plans for the proper management of transboundary aquifers and aquifer systems. This article also goes beyond the corresponding provision of the *UN Convention*.⁴⁵ The study group recommends that both articles use the “shall, wherever appropriate” language. This is consistent with the approach taken in the *Berlin Rules*, and sends a message of progressive development without attempting to create a strictly binding obligation where none now exists.⁴⁶

PART IV.

ACTIVITIES AND CONDITIONS AFFECTING OTHER STATES

⁴⁴ Cf. *Berlin Rules*, art. 39(c).

⁴⁵ *UN Convention*, art. 24(1). The *UN Convention* includes eleven articles on how this cooperation is to be managed, articles that would have to be adapted to aquifer systems should these draft articles be proposed as a free-standing legal instrument.

⁴⁶ See *Berlin Rules*, arts. 42(2), 58, 64.

Article 174.

Activities affecting other States

1. When a State has reasonable grounds for believing that a particular existing or planned activity in its territory may affect a transboundary ~~aquifer or aquifer system~~ and thereby may have a significant adverse effect upon another State, it shall, ~~as far as practicable~~, assess the possible effects of such activity.
2. Before a State implements or permits the implementation of the planned activities ~~which may affect a transboundary aquifer or aquifer system and thereby may have a significant adverse effect upon another State~~ referred to in paragraph 1 of this draft article, it shall provide that State with timely notification thereof. Such notification shall be accompanied by available technical data and information, including any environmental impact assessment, in order to enable the notified State to evaluate the possible effects of the planned activities.
3. If the notifying and the notified States disagree on the possible effect of the planned activities, they shall enter into consultations and, if necessary, negotiations with a view to arriving at an equitable resolution of the situation. They may utilize an independent fact-finding body to make an impartial assessment of the effect of the planned activities.

Commentary: This draft article further responds to the problematic exclusion of recharge and discharge zones from the concept of the aquifer system by recognizing an obligation on all States to plan and consult for activities that could affect a transboundary aquifer system. The obligation to assess impacts is central to the application of sustainability and the precautionary approach, but it is more properly expressed as extending to the more broadly defined aquifer system as a whole. The obligation originally set forth in this draft article, limited to “planned activities,” parallel to the *UN Convention’s* provisions regarding “planned measures.”⁴⁷ There is no reason why, if a State becomes aware of reasonable grounds for believing that an existing activity could affect a transboundary aquifer system, it should be under a lesser duty to notify and consult with affected States than for planned activities, particularly if the possibility of such effects were not considered when the existing activity began.⁴⁸ Thus the study group recommends expanding the obligation beyond that in the *UN Convention* to reach all relevant activities.

This draft article, with or without the extension of coverage proposed by the study group, summarizes in general terms the entire scheme of consultation set forth in eight articles of the *UN Convention*,⁴⁹ and necessarily omits much detail. This is acceptable if the draft articles are to be a supplemental instrument of some kind to the *UN Convention*, but is perhaps inadequate if the draft articles are to become a free-standing legal instrument, whether legally binding or otherwise. In the latter case, probably all eight of the articles (with or without modification) should be included. Some might want to strengthen the obligation in the draft article further by requiring, in paragraph 1, an aquifer State to assess effects as far as possible rather than as far as practicable. Such a stronger rule will preclude a State from undertaking a planned activity if they lack the means, and cannot, or will not, join in a joint assessment process to undertake the necessary assessment. The study group would delete the reference to practicability to the same end. The study group also suggests simplifying the language of paragraph 2 as indicated.

⁴⁷ *UN Convention*, arts. 12, 18(1).

⁴⁸ *Cf. Berlin Rules*, arts. 29 (the on-going obligation to assess impacts), 57 (the obligation to notify other concerned states about programs, plans, projects, or activities that are likely to affect other States and to exchange information regarding the same).

⁴⁹ *UN Convention*, arts. 12 to 19.

Article 18.

Harmful Conditions

Aquifer States shall, individually and, where appropriate, jointly, take all appropriate measures to identify, prevent, mitigate, minimize, and, to the extent practicable, eliminate harmful conditions related to a transboundary aquifer system, whether resulting from natural causes or human conduct, such as flood or ice conditions, water-borne diseases, subsidence, erosion, salt-water intrusion, drought, or desertification.

Commentary: The study group noted the omission of any provision on harmful conditions generally from the draft articles, although such a provision is included in the *UN Convention* and the *Berlin Rules*.⁵⁰ While one might conclude that other draft articles are broad enough to cover this matter, the omission might appear significant given its separate inclusion in the *UN Convention*, from which so much of these draft articles are drawn. This proposed article follows the language of the *UN Convention*,⁵¹ which in turn reflects customary international law expressed in numerous international environmental instruments. The duty to prevent, mitigate, or eliminate harmful conditions is a particular application of the duty to minimize environmental harm generally and to prevent significant harm to other States.⁵² We have added the duty to identify, minimize, or eliminate the harmful conditions to the duty to prevent or mitigate as found in the *UN Convention* in order to be consistent with the similar duties expressed in draft articles 10 and 11 (renumbered as articles 13 and 14). That States are bound to cooperate in appropriate cases with other States in taking such steps is sometimes explicit in international environmental agreements and arises from the general duty of cooperation as set forth in draft article 7 (renumbered as article 11). The study group therefore proposes adding such a draft article, modeled closely after the parallel provision in the *UN Convention*, but adapted to the circumstances relevant to an aquifer system.

Adding this draft article also make it reasonable to group this and the following draft article in the chapter on “Activities affecting other States,” now recaptioned “Activities and conditions affecting other States.” Lumping emergency situations, not to mention harmful conditions, in a catch-all chapter of miscellaneous provisions, as was done with original draft article 16 (renumbered as article 19), seems to treat the matter of being of lesser significance to the overall management of a transboundary aquifer system. The study group did not think this was the International Law Commission’s intention, but the problem can easily be solved by the proposed arrangement.

Article 196.

Emergency situations

1. **Where an emergency poses a threat to vital human needs, aquifer States, notwithstanding draft articles 74 and 96, may take measures that are strictly necessary to meet such needs.**
1. ~~For the purpose of the present article, “emergency” means a situation, resulting suddenly from natural causes or from human conduct, that poses an imminent threat of causing serious harm to aquifer States or other States.~~
2. **Where an emergency affects a transboundary aquifer or aquifer system and thereby poses an imminent threat to States, the following shall apply:**
 - (a) **The State within whose territory the emergency originates shall:**

⁵⁰ *Id.*, art. 27; *Berlin Rules*, art. 32.

⁵¹ *UN Convention*, art. 27.

⁵² *Berlin Rules*, arts. 8 (minimization of environmental harm), 16 (avoidance of harm to other States).

- (i) **without delay and by the most expeditious means available, notify other potentially affected States and competent international organizations of the emergency;**
 - (ii) **in cooperation with potentially affected States and, where appropriate, competent international organizations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate any harmful effect of the emergency;**
 - (b) **States shall provide scientific, technical, logistical and other cooperation to other States experiencing an emergency. Cooperation may include coordination of international emergency actions and communications, making available trained emergency response personnel, emergency response equipments and supplies, scientific and technical expertise and humanitarian assistance.**
- ~~3. Where an emergency poses a threat to vital human needs, aquifer States, notwithstanding draft articles 4 and 6, may take measures that are strictly necessary to meet such needs.~~
- 3. Aquifer States shall jointly develop contingency plans for responding to emergencies, in cooperation, where appropriate, with other potentially affected States and competent international organizations.**

Commentary: This draft article parallels the comparable provisions of the *UN Convention* and the *Berlin Rules*.⁵³ The study group proposes to move the definition in paragraph 1 to draft article 2 (which contains all the other definitions), renumbering the remaining paragraphs. The study group would reverse the order of original paragraphs 2 and 3 (now renumbered as paragraphs 1 and 2 above.) This emphasizes the importance of an effective and timely response when vital human needs are at stake. It also is consistent with the precautionary principle expressed in proposed article 5. The study group would also add a new paragraph 3 based upon parallel language in the *UN Convention*,⁵⁴ adapting the language to the circumstances of aquifer systems. Given the special vulnerabilities of aquifer systems, the language of the paragraph 3 has been made somewhat stronger than the comparable provision in the *UN Convention* by eliminating the qualifying phrase “where necessary.”

PART VI.

MISCELLANEOUS PROVISIONS

Article 205.

Scientific and technical cooperation

States shall, directly or through competent international organizations, promote scientific, educational, technical, legal, and other cooperation with special attention to the needs of developing states for the protection and management of transboundary aquifers or aquifer systems. Such cooperation shall include, *inter alia*:

- (a) Training of their scientific, ~~and~~ technical, and legal personnel;**
- (b) Facilitating their participation in relevant international programmes;**
- (c) Supplying them with necessary equipment and facilities;**
- (d) Enhancing their capacity to manufacture such equipment;**
- (e) Providing advice on and developing facilities for research, monitoring, educational and other programmes;**

⁵³ *UN Convention*, art. 28; *Berlin Rules*, arts. 32, 33.

⁵⁴ *UN Convention*, art. 28(4).

- (f) Providing advice on and developing facilities for minimizing the detrimental effects of major activities affecting transboundary aquifers or aquifer systems;**
- (g) Preparing environmental impact assessments.**

Commentary: The obligation of States to cooperate in the management of transboundary aquifer systems requires a considerable amount of scientific and technical (in the broadest sense) cooperation, as spelled out in this draft article. Compliance with the obligations set forth in these draft articles depends predominantly on resources and capacity. While the need for such cooperation goes beyond simply recognizing the needs of developing states, this article attempts to ensure that developing States have the necessary resources and capacity. The study group would do so by recognizing the special attention due to such needs. This article, as originally written, neglects the importance of creating the necessary laws and legal institutions to ensure compliance with the obligations of these draft articles. The study group proposes recognizing that need in its proposed revisions to this draft article. The study group noted that the draft article says nothing about the financing that would be required to accomplish the cooperation the article prescribes, particularly as it would impact on developing States. Given the complex and shifting nature of financial assistance regarding such matters as are discussed in this draft article, it probably would be inappropriate to attempt to spell out any obligations regarding financial assistance, yet the need for such assistance must be kept in mind if the obligations set forth in this draft article are to be realized.

Article 217.

Protection in time of armed conflict

Transboundary aquifers or aquifer systems and related installations, facilities and other works shall enjoy the protection accorded by the principles and rules of international law applicable in international and non-international armed conflicts and shall not be used in violation of those principles and rules.

Commentary: This draft article parallels the comparable provisions of the *UN Convention*.⁵⁵ While the *Berlin Rules* provide considerably more detail regarding the protection due in times of armed conflict,⁵⁶ such detail is probably not necessary in these draft articles.

Article 2218

Data and information concerning national defence or security

Nothing in the present draft articles obliges a State to provide data or information the confidentiality of which is essential to its national defence or security. Nevertheless, that State shall cooperate in good faith with other States with a view to providing as much information as possible under the circumstances.

Commentary: This draft article parallels the comparable provisions of the *UN Convention*.⁵⁷ The comparable provision of the *Berlin Rules* provides a more complete listing of proper reasons for keeping information confidential.⁵⁸ If these draft articles are to become a free-standing legal in-

⁵⁵ *UN Convention*, art. 29.

⁵⁶ *Berlin Rules*, arts. 50 to 55.

⁵⁷ *UN Convention*, art. 31.

⁵⁸ *Berlin Rules*, arts. 18(4), 56(5):

In providing information consistently with this Article, States need not provide access to information that would compromise:

- a. Intellectual property rights, including commercial or industrial secrets;
- b. Rights of individual privacy;

strument, consideration should be given to expanding this list in the fashion of the *Berlin Rules*. Consideration should also be given to reversing the order of the sentences in order to emphasize the centrality of the obligation to cooperate in good faith, while treating the protection of data on grounds of national defence or security as a qualification of the general obligation rather than as the primary point of the draft article.

Article 229.

Bilateral and regional agreements or arrangements

For the purpose of managing a particular transboundary ~~aquifer or~~ aquifer system, aquifer States are encouraged to enter into bilateral or regional agreements or arrangements among themselves. Such agreement or arrangement may be entered into with respect to an entire ~~aquifer or~~ aquifer system or any part thereof or a particular project, programme or utilization, except insofar as the agreement or arrangement adversely affects, to a significant extent, the utilization, by one or more other aquifer States of the water in that ~~aquifer or~~ aquifer system, without their express consent.

PART THREE

DRAFT ARTICLES ON THE LAW OF TRANSBOUNDARY AQUIFERS

PART I.

INTRODUCTION

Article 1.

Scope

The present draft articles apply to:

- (a) utilization of transboundary aquifer systems;**
- (b) other activities that have or are likely to have an impact upon those aquifer systems; and**
- (c) measures for the protection, preservation and management of those aquifer systems.**

Article 2.

Use of terms

For the purposes of the present draft articles:

- (a) “aquifer” means a permeable water-bearing underground geological formation underlain by a less permeable layer and the water contained in the saturated zone of the formation;**
- (b) “aquifer system” means one or more aquifers and its or their recharge and discharge zones as well as hydraulically connected surface waters;**
- (c) “transboundary aquifer system” means an aquifer system, parts of which are situated in different States [or which is hydraulically connected to watercourses that are situated in different States];**
- (d) “aquifer State” means a State in whose territory any part of a transboundary aquifer system is situated;**

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- c. Criminal investigations or trials;
 - d. National security; and
 - e. Information that could endanger ecosystems, historic sites, and other naturally or culturally important objects or locations.

- (e) “recharging aquifer” means an aquifer that receives a non-negligible amount of contemporary water recharge;
- (f) “recharge zone” means the zone which contributes water to an aquifer, consisting of the catchment area of rainfall water and the area where such water flows to an aquifer by runoff on the ground and infiltration through soil;
- (g) “discharge zone” means the zone where water originating from an aquifer flows to its outlets, such as a watercourse, a lake, an oasis, a wetland or an ocean;—
- (h) “emergency” means a situation, whether resulting from natural causes or from human conduct, that poses an imminent threat of causing serious harm to an aquifer system or to aquifer States or other States.

PART II. GENERAL PRINCIPLES

Article 3.

Each aquifer State has sovereignty over the portion of a transboundary aquifer system located within its territory. It shall exercise its sovereignty in accordance with international law.

Article 4.

Sustainability

1. States shall give effect to the principle of sustainability in protecting, preserving, and managing aquifer systems, taking into account natural and artificial recharge.
2. In withdrawing water from an aquifer, sustainability at the least requires:
 - a. the participation of affected persons and communities in decisions affecting aquifers on which their well-being depends
 - b. in utilizing a non-recharging transboundary aquifer system, aquifer States shall aim at maximizing the long-term benefits derived from the use of the water contained therein;
 - c. in utilizing a recharging transboundary aquifer system, aquifer States shall not utilize the aquifer system at a level greater than the recharge rate, although exceptional circumstances may justify temporarily exceeding recharge rates.

Article 5.

The Precautionary Approach

In view of uncertainty about the nature and extent of aquifer systems and of their special vulnerability to detrimental impacts from human activity, aquifer States shall take a precautionary approach.

Article 6

Minimization of Environmental Harm

States shall take all appropriate measures to prevent or minimize environmental harm.

Article 7.

Equitable and reasonable utilization

Aquifer States shall utilize a transboundary aquifer system according to the principle of equitable and reasonable utilization having due regard to the avoidance of significant harm to other aquifer States as follows:

- (a) they shall utilize the transboundary aquifer system in a manner that is consistent with the equitable and reasonable accrual of benefits therefrom to the aquifer States concerned; and**
- (b) they shall establish individually or jointly an overall utilization plan, taking into account present and future needs of, and alternative water sources for, the aquifer States.**

Article 8.

Factors relevant to equitable and reasonable utilization

- 1. Utilization of a transboundary aquifer system in an equitable and reasonable manner within the meaning of draft article 7 requires taking into account all relevant factors, including:**
 - (a) the population dependent on the aquifer system in each aquifer State;**
 - (b) the social, economic and other needs, present and future, of the aquifer States concerned;**
 - (c) the natural characteristics of the aquifer system;**
 - (d) an aquifer State's physical access to the waters in the aquifer system;**
 - (e) the existing and potential utilization of the aquifer system;**
 - (f) the actual and potential effects of the utilization of the aquifer system in one aquifer State on the other aquifer States concerned;**
 - (g) the availability of alternatives to a particular existing and planned utilization of the aquifer system;**
 - (h) the development, protection and conservation of the aquifer system and the costs of measures to be taken to that effect;**
 - (i) the role of aquifer system in the related ecosystem.**
- 2. The weight to be given to each factor is to be determined by its importance with regard to a specific transboundary aquifer system in comparison with that of other relevant factors. In determining what is equitable and reasonable utilization, all relevant factors are to be considered together and a conclusion reached on the basis of all the factors. However, in weighing different utilizations of a transboundary aquifer system, vital human needs shall not be compromised.**

Article 9.

Obligation not to cause significant harm to other aquifer States

- 1. Aquifer States shall, in utilizing a transboundary aquifer system in their territories, take all appropriate measures to prevent the causing of significant harm to other aquifer States having due regard to the right of each aquifer State to make an equitable and reasonable utilization of the waters of the system.**
- 2. Aquifer States shall, in undertaking activities other than utilization of a transboundary aquifer system that have, or are likely to have, an impact on that transboundary aquifer system, take all appropriate measures to prevent the causing of significant harm through that aquifer system to other aquifer States having due regard to the right of each aquifer State to make an equitable and reasonable utilization of the waters of the system.**

Article 10.

General obligation to cooperate

1. **Aquifer states shall cooperate on the basis of sovereign equality, territorial integrity, sustainability, mutual benefit and good faith in implementing their obligations relating to transboundary aquifer systems under international law.**
2. **For the purpose of paragraph 1, aquifer States shall, as appropriate, establish joint or coordinated mechanisms of cooperation, such as:**
 - (a) **management institutions (article 16);**
 - (b) **monitoring and assessment (articles 15 and 17);**
 - (c) **databases (article 11(5));**
 - (d) **environmental impact assessments (article 17(2));**
 - (e) **communication, warning, and alarm systems (article 19(2));**
 - (f) **contingency plans for harmful conditions and emergencies (article 19(3));**
 - (g) **research and development (article 20); and**
 - (h) **mutual assistance (articles 19(1), 20).**

Article 11.

Regular exchange of data and information

1. **Pursuant to Article 7, aquifer States shall, on a regular basis, exchange readily available data and information on the condition of the transboundary aquifer systems, in particular of a geological, hydrogeological, hydrological, meteorological and ecological nature and related to the hydrochemistry of the aquifer system, on the utilization of the systems, and on other activities that have or are likely to have an impact on those systems, and on measures to protect, preserve, or manage those systems, as well as related forecasts.**
2. **Where knowledge about the nature and extent of some transboundary aquifer systems is inadequate, aquifer States concerned shall employ their best efforts to collect and generate more complete data and information relating to such aquifer or aquifer systems, taking into account current practices and standards. They shall take such action individually or jointly and, where appropriate, together with or through international organizations.**
3. **If an aquifer State is requested by another aquifer State to provide data and information relating to an aquifer systems that are not readily available, it shall employ its best efforts to comply with the request. The requested State may condition its compliance on payment by the requesting State of the reasonable costs of collecting and, where appropriate, processing such data or information.**
4. **Aquifer States shall, where appropriate, employ their best efforts to collect and process data and information in a manner that facilitates their utilization by the other aquifer States to which such data and information are communicated.**
5. **In addition to the implementation of joint monitoring and assessment programs under draft articles 13 and 15, aquifer States shall, where appropriate, create joint institutional mechanisms for collecting, generating, processing, assessing, analyzing, updating, disseminating, and publishing data and information relative to a transboundary aquifer system, including the creation and maintenance of a comprehensive and unified database on such system.**

PART III.

PROTECTION, PRESERVATION AND MANAGEMENT

Article 12.

Protection and preservation of ecosystems

Aquifer States shall take all appropriate measures to protect and preserve ecosystems within, or dependent upon, their transboundary aquifer systems, including measures to ensure that the quality and quantity of water in the system is sufficient to protect and preserve such ecosystems.

Article 13.

Recharge and Discharge Zones

Aquifer States shall, individually and, where appropriate, jointly, identify recharge and discharge zones of their aquifer systems and, within these zones, shall take special measures to prevent, minimize, control, and, to the extent practicable, eliminate detrimental impacts on the recharge and discharge processes.

Article 14.

Prevention, reduction and control of pollution

Aquifer States shall, individually and, where appropriate, jointly, prevent, minimize, control, and, to the extent practicable, eliminate pollution of their aquifer or aquifer system, including through the recharge process, that may cause significant harm to other aquifer States.

Article 15.

Monitoring

- 1. Aquifer States shall monitor their transboundary aquifer system. They shall, wherever possible, carry out these monitoring activities jointly with other aquifer States concerned and, where appropriate, in collaboration with the competent international organizations. Where, however, monitoring activities are not carried out jointly, the aquifer States shall exchange the monitored data among themselves.**
- 2. Aquifer States shall use agreed or harmonized standards and methodology for monitoring their transboundary aquifer systems and identify key parameters that they will monitor based on an agreed conceptual model of the system. They shall include parameters on the condition of the system, on the utilization of the system, on other activities that have or are likely to have an impact on the system, and on measures to protect, preserve, or manage the system, as listed in article 11, paragraph 1, and also on the utilization of the aquifer and aquifer system.**

Article 16.

Management

Aquifer States shall establish and implement plans and programs for the proper management of their transboundary aquifer system in accordance with the provisions of the present draft articles. They shall, at the request by any of them, enter into consultations concerning the management of a transboundary aquifer system. A joint mechanism shall be established, wherever appropriate.

PART IV.

ACTIVITIES AND CONDITIONS AFFECTING OTHER STATES

Article 17.

Activities affecting other States

- 1. When a State has reasonable grounds for believing that a particular existing or planned activity in its territory may affect a transboundary aquifer system and thereby may have a significant adverse effect upon another State, it shall assess the possible effects of such activity.**

2. Before a State implements or permits the implementation of the planned activities referred to in paragraph 1 of this draft article, it shall provide that State with timely notification thereof. Such notification shall be accompanied by available technical data and information, including any environmental impact assessment, in order to enable the notified State to evaluate the possible effects of the planned activities.
3. If the notifying and the notified States disagree on the possible effect of the planned activities, they shall enter into consultations and, if necessary, negotiations with a view to arriving at an equitable resolution of the situation. They may utilize an independent fact-finding body to make an impartial assessment of the effect of the planned activities.

Article 18.

Harmful Conditions

Aquifer States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent, mitigate, minimize, and, to the extent practicable, eliminate harmful conditions related to a transboundary aquifer system, whether resulting from natural causes or human conduct, such as flood or ice conditions, water-borne diseases, subsidence erosion, salt-water intrusion, drought, or desertification.

Article 19.

Emergency situations

1. Where an emergency poses a threat to vital human needs, aquifer States, notwithstanding draft articles 7 and 9, may take measures that are strictly necessary to meet such needs.
2. Where an emergency affects a transboundary aquifer system and thereby poses an imminent threat to States, the following shall apply:
 - (a) The State within whose territory the emergency originates shall:
 - (i) without delay and by the most expeditious means available, notify other potentially affected States and competent international organizations of the emergency;
 - (ii) in cooperation with potentially affected States and, where appropriate, competent international organizations, immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate any harmful effect of the emergency;
 - (b) States shall provide scientific, technical, logistical and other cooperation to other States experiencing an emergency. Cooperation may include coordination of international emergency actions and communications, making available trained emergency response personnel, emergency response equipments and supplies, scientific and technical expertise and humanitarian assistance.
3. Aquifer States shall jointly develop contingency plans for responding to emergencies, in cooperation, where appropriate, with other potentially affected States and competent international organizations.

PART V.

MISCELLANEOUS PROVISIONS

Article 20.

Scientific and technical cooperation

States shall, directly or through competent international organizations, promote scientific, educational, technical, legal, and other cooperation with special attention to the needs of developing states for the protection and management of transboundary aquifers or aquifer systems. Such cooperation shall include, *inter alia*:

- (a) Training of their scientific, technical, and legal personnel;
- (b) Facilitating their participation in relevant international programmes;
- (c) Supplying them with necessary equipment and facilities;
- (d) Enhancing their capacity to manufacture such equipment;
- (e) Providing advice on and developing facilities for research, monitoring, educational and other programmes;
- (f) Providing advice on and developing facilities for minimizing the detrimental effects of major activities affecting transboundary aquifers or aquifer systems;
- (g) Preparing environmental impact assessments.

Article 21.

Protection in time of armed conflict

Transboundary aquifer systems and related installations, facilities and other works shall enjoy the protection accorded by the principles and rules of international law applicable in international and non-international armed conflicts and shall not be used in violation of those principles and rules.

Article 22.

Data and information concerning national defence or security

Nothing in the present draft articles obliges a State to provide data or information the confidentiality of which is essential to its national defence or security. Nevertheless, that State shall cooperate in good faith with other States with a view to providing as much information as possible under the circumstances.

Article 23.

Bilateral and regional agreements or arrangements

For the purpose of managing a particular transboundary aquifer system, aquifer States are encouraged to enter into bilateral or regional agreements or arrangements among themselves. Such agreement or arrangement may be entered into with respect to an entire aquifer system or any part thereof or a particular project, programme or utilization, except insofar as the agreement or arrangement adversely affects, to a significant extent, the utilization, by one or more other aquifer States of the water in that aquifer system, without their express consent.