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## A Survey of International Law Relating to Flood Management: Existing Practices and Future Prospects

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# A Survey of International Law Relating to Flood Management: Existing Practices and Future Prospects

## ABSTRACT

*Numerous human and environmental factors threaten to increase the likelihood and magnitude of floods throughout the world. At present, the law of international watercourses provides the basic norms by which states cooperate over flood-related matters. More specific provisions related to flood management can be found in a limited number of regional and basin-specific treaties. Within the European context, examples include the recently adopted Floods Directive and the Model Provisions of the U.N. Economic Commission for Europe Helsinki Convention. However, much more effort is needed to learn lessons from existing practices to enhance the legal framework for managing transboundary floods.*

## I. INTRODUCTION

It is predicted that the number of people vulnerable to floods will reach two billion by 2050 as a result of climate change, deforestation, rising sea levels, and population growth in flood-prone areas.<sup>1</sup> Poorly managed floods constitute a major impediment in alleviating poverty and meeting the targets of the Millennium Development Goals.<sup>2</sup> The negative impacts of floods can be seen throughout the world.<sup>3</sup> Such events attest to an increase in flood related disasters in recent years.<sup>4</sup> Floods, however, do not only bring negative impacts. Flood plains provide fertile agricultural lands,

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1. Press Release, United Nations University, Two Billion People Vulnerable to Floods by 2050 (June 13, 2004), available at <http://www.unu.edu/news/ehs/floods.doc>.

2. WORLD WATER ASSESSMENT PROGRAMME, WATER A SHARED RESPONSIBILITY: THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT 2, at 6 (2006), available at <http://unesdoc.unesco.org/images/0014/001454/145405E.pdf>.

3. See TAREK MERBTENE & JUNICHI YOSHITANI, PWRI TECHNICAL MEMO. NO. 3985, TECHNICAL REPORT ON GLOBAL TRENDS OF WATER-RELATED DISASTERS, (2005), available at <http://www.icharm.pwri.go.jp/html/research/pdf/no3985.pdf>.

4. *Id.* at 34.

replenish wetlands, and recharge groundwater resources.<sup>5</sup> In the Mekong Region, for example, almost 80 percent of Mekong fish species only breed in seasonally flooded areas.<sup>6</sup>

While traditional measures relating to flood management focused on reducing the negative impacts of floods, recent thinking has shifted towards a more holistic and integrated approach.<sup>7</sup> The concept of integrated flood management (IFM) identifies four key elements that should be present in order to ensure that floods are managed successfully within the greater context of integrated water resources management. These elements include: (1) ensuring the water cycle is managed as a whole, thus recognizing the linkages between groundwater and flood water; (2) the integration of land-use planning in water management and the adoption of the best mix of strategies, both structural and non-structural, depending on the characteristics of the river system and the region; (3) a participatory approach involving users, planners, and policymakers at all levels; and (4) the adoption of integrated hazard management approaches whereby members from all sectors—fisheries, agriculture, forestry, industry, hydropower, and so forth—are involved in the process and carrying out activities to ensure implementation of disaster management plans.<sup>8</sup>

Within the context of watercourses shared by more than one country, an integrated approach to flood management poses unique challenges as the flood related land and water policies within one state may have negative consequences on other states. For example, large-scale deforestation upstream might increase the likelihood and severity of floods downstream. Similarly, urbanization may increase overland flow volume causing harm to downstream states.

When dealing with issues of flood management, the significance of international watercourses should not be underestimated. There are 263 international river basins around the world.<sup>9</sup> These international river basins account for nearly one-half of the world's land surface, generate around 60 percent of global freshwater flow, and are home to

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5. See ASSOCIATED PROGRAMME ON FLOOD MGMT., INTEGRATED FLOOD MANAGEMENT 7 (2003), available at [http://www.apfm.info/pdf/concept\\_paper\\_e.pdf](http://www.apfm.info/pdf/concept_paper_e.pdf).

6. World Wildlife Fund, WWF Working Towards "Fish for Tomorrow," [http://www.panda.org/about\\_wwf/where\\_we\\_work/asia\\_pacific/where/cambodia/index.cfm?uNewsID=93420](http://www.panda.org/about_wwf/where_we_work/asia_pacific/where/cambodia/index.cfm?uNewsID=93420) (last visited Jan. 5, 2009).

7. See, e.g., Associated Programme on Flood Mgmt., A New Approach to Flood Management, <http://www.apfm.info/index.htm> (last visited Jan. 5, 2009); World Meteorological Org., International Flood Initiative, <http://www.wmo.ch/pages/prog/hwrrp/IFI.html> (last visited Jan. 5, 2009).

8. THE ASSOCIATED PROGRAMME ON FLOOD MGMT., *supra* note 5, at 16–23.

9. Aaron T. Wolf et al., *International River Basins of the World*, 15 INT'L J. WATER RESOURCES DEV. 387 (1999).

approximately 40 percent of the world's population.<sup>10</sup> Research has shown that the presence or absence of laws and institutions is one of the most important factors influencing relations between states sharing transboundary waters. In fact, the importance of legal and institutional factors exceeds that of more traditionally cited factors, such as climate, water availability, population density, political orientation, and levels of economic development.<sup>11</sup> Unfortunately, in many transboundary waters, international agreements are either weak or absent, significantly hindering efforts to promote flood management principles at the transboundary basin level.<sup>12</sup>

The purpose of this article is to examine the extent to which international law takes into account flood related issues. In so doing, this article first examines whether the general rules and principles related to international watercourses deal with flood issues. This article then considers treaty practice that relates specifically to flood issues. This analysis covers both treaties that are solely dedicated to flood issues and flood specific provisions of treaties with a broader scope. Since the International Law Association has developed detailed rules on flood control, a study of its work is also provided. This article concludes by assessing whether the current legal framework is sufficient to cope with transboundary floods.

## II. THE LAW OF INTERNATIONAL WATERCOURSES AND FLOOD MANAGEMENT

### A. The Evolution and Current Status of the Law of International Watercourses

There have been various multilateral efforts to codify and progressively develop international law in the field of international watercourses, including the work on the 1997 U.N. Watercourses Convention<sup>13</sup> and the

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10. *Id.*

11. Meredith A. Giordano & Aaron T. Wolf, *Sharing Waters: Post-Rio International Water Management*, 27 NAT. RESOURCES F. 163, 170 (2003).

12. GLOBAL INTERNATIONAL WATERS ASSESSMENT, CHALLENGES TO INTERNATIONAL WATERS: REGIONAL ASSESSMENTS IN A GLOBAL PERSPECTIVE 13 (2006), available at [http://www.preventionweb.net/files/2365\\_giwafinalreport.pdf](http://www.preventionweb.net/files/2365_giwafinalreport.pdf).

13. Convention on the Law of Non-Navigational Uses of International Watercourses, May 21, 1997, 36 I.L.M. 700 (1997) (not yet in force) [hereinafter U.N. Watercourses Convention]. See also ATTILA TANZI & MAURIZIO ARCARI, THE UNITED NATIONS CONVENTION ON THE LAW OF THE INTERNATIONAL WATERCOURSES: A FRAMEWORK FOR SHARING 1-5 (2001); Stephen C. McCaffrey & Mpazi Sinjela, *The 1997 United Nations Watercourses Convention on International Watercourses*, 92 AM. J. INT'L L. 97 (1998).

related work of the International Law Commission (ILC)<sup>14</sup> and the International Law Association (ILA).<sup>15</sup>

The 1997 U.N. Watercourses Convention, while not yet in force, is the most authoritative statement of international law in the field because it was drafted by leading legal experts and then negotiated by state representatives within the U.N. General Assembly. While some disagreements remain between the states, the carefully negotiated text of the U.N. Watercourses Convention represents a significant consensus among many states around the world as to the current status of international law in the field. Such consensus is reflected in the voting record, which shows that 103 states voted in favor of the Convention, while only three states voted against it.<sup>16</sup>

Support for the 1997 U.N. Watercourses Convention is also found at the regional and basin level. The Southern African Development Community, for example, revised their regional 1995 Protocol on Shared Watercourse Systems in light of the 1997 U.N. Watercourses Convention.<sup>17</sup>

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14. The International Law Commission (ILC) was established in 1947 by the U.N. General Assembly. The aim of the ILC is to codify and progressively develop international law through drafts on certain topics of international law. The ILC has 34 members who are elected by the U.N. General Assembly for five-year terms, and serve in their individual capacity. See International Law Commission, <http://www.un.org/law/ilc/> (last visited Jan. 5, 2009). Upon the recommendation of the U.N. General Assembly, the ILC took up the study of the law of non-navigational uses of international watercourses in the 1970s. The ILC's work culminated in the adoption of the 1994 Draft Articles on the Law of the Non-navigational Uses of International Watercourses, which is in turn the basis of the U.N. Watercourses Convention.

15. The International Law Association (ILA), established in 1872 in Brussels, is the largest organization of international lawyers with roughly 3,700 members throughout the world. Inspired by several serious international river disputes at the time, including the Indus, the Jordan, the Nile and the Columbia, the Rivers Committee of the ILA was established in 1954, and after the completion of the Helsinki Rules on the Uses of the Waters of International Rivers, adopted by the ILA at the 52nd Conference in Helsinki, Finland in August 1966, a new Water Resources Committee was established, and has been in existence, almost uninterrupted since 1966. The Committee has developed numerous supplementary provisions to the Helsinki Rules culminating in the adoption of the Berlin Rules on the Water Resources by the ILA at the 71st Conference in Berlin, Germany in August 2004. See generally SLAVKO BOGDANOVIC, *INTERNATIONAL LAW OF WATER RESOURCES: CONTRIBUTION OF THE INTERNATIONAL LAW ASSOCIATION 1954-2000* (2001).

16. Press Release, General Assembly, General Assembly Adopts Convention on the Law of Non-Navigational Uses of International Watercourses, U.N. Doc. GA/9248 (May 21, 1997), at annex, available at <http://www.un.org/News/Press/docs/1997/19970521.ga9248.html>.

17. Southern African Development Community, Revised Protocol on Shared International Watercourses, Aug. 7, 2000, 40 I.L.M. 321 (2001); See also Salman M.A. Salman, *Introductory Note to SADC: Revised Protocol on Shared Watercourses in the Southern African Development Community*, 4 I.L.M. 317, 318 (2001).

At the basin level, the 1995 Mekong Agreement,<sup>18</sup> the 2002 Sava River Basin Agreement,<sup>19</sup> and the 2005 Zambezi Watercourse Commission Agreement<sup>20</sup> all reflect provisions similar to the 1997 U.N. Watercourses Convention.

## B. Rules and Principles Relating to International Watercourses

There are four key areas where international law plays a central role in the management of transboundary waters: (1) scope; (2) substantive norms; (3) implementation mechanisms; and (4) dispute settlement mechanisms.<sup>21</sup>

Scope refers to the geographical and functional application of a treaty. Within the transboundary waters context, provisions related to scope should determine *who* is entitled to *what* water. Most importantly, provisions related to scope identify the resource in question, for example, groundwater, a watercourse, or a drainage basin. While the substantive rules and principles set out the general rights and obligations pertaining to management of transboundary waters, effective application of such norms is only possible if accompanied by a set of implementation mechanisms. Implementation mechanisms should be designed to ensure that the substantive norms are both transposed into national law and policy, and monitored and reassessed in light of changed circumstances. Finally, dispute settlement mechanisms seek to ensure that any disputes between states, both on points of law and fact, are resolved in a peaceful manner.

### 1. Scope

Numerous activities upstream can have an impact on downstream users, and to some extent, vice versa. For example, urbanization in the upper reaches of a basin can increase the likelihood and severity of floods downstream due to the replacement of naturally porous surfaces with roads, parking lots, and other non-porous surfaces. Developing on wetlands and floodplains, which act as natural sponges during flood events, can affect the occurrence, location, and magnitude of floods. Deforestation has also been identified as a contributor to increased flood events as a result of greater runoff, mudslides, and the build-up of sediment loads within the

18. Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, Apr. 5, 1995, 34 I.L.M. 864 (1995) [hereinafter Mekong Agreement].

19. Framework Agreement on the Sava River Basin, Dec. 3, 2002, available at <http://faolex.fao.org/docs/pdf/mul45452.pdf>.

20. Agreement on the Establishment of the Zambezi Watercourse Commission, July 13, 2004, available at <http://www.zacpro.org/downloads/ZAMCOM%20AGREEMENT.pdf>.

21. See PATRICIA WOUTERS ET AL., TRANSFORMING POTENTIAL CONFLICT INTO CONFLICT POTENTIAL: THE ROLE OF INTERNATIONAL WATER LAW 46 (2003), available at <http://unesdoc.unesco.org/images/0013/001332/133258e.pdf>.

river channel. In addition, the interaction between groundwater and surface water may be relevant because flood events play a major role in groundwater recharge and storage, particularly in alluvial flood plains.<sup>22</sup>

Therefore, the main question to consider in terms of scope is whether the law of international watercourses takes into account the flood related upstream-downstream and surface water-groundwater linkages described above. In relation to the interaction between upstream land use practices, such as urban development, and downstream impacts, the "drainage basin approach" presented in the 1966 International Law Association's Helsinki Rules is noteworthy.<sup>23</sup> Article I of the Rules provides that they are "applicable to the use of the waters of an international drainage basin."<sup>24</sup> The Rules go on to define an "international drainage basin" as being "a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus."<sup>25</sup> In terms of scope, the drainage basin approach adopted by the ILA would encapsulate flood-related activities such as urbanization, deforestation, and groundwater recharge.

Unlike the ILA, the 1997 U.N. Watercourses Convention is less explicit in defining terms. Article 1 of the Convention provides that the "Convention applies to uses of international watercourses and their waters for purposes other than navigation and to measures of protection and management related to the uses of those watercourses and their waters."<sup>26</sup> The use of the term "watercourse" is narrower than that of "drainage basin."<sup>27</sup> While there was considerable debate among states as to which term would be most appropriate, ultimately a "drainage basin approach"

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22. ASSOCIATED PROGRAMME ON FLOOD MGMT., *supra* note 5, at 18-19.

23. Helsinki Rules on the Uses of the Waters of International Rivers, adopted by the ILA at the 52nd Conference, Helsinki, Finland, Aug. 1966 [hereinafter Helsinki Rules]. See also James L. Wescoat Jr., *Beyond the River Basin: The Changing Geography of International Water Problems and International Watercourse Law*, 3 COLO. J. INT'L ENVTL. L. POL'Y 301 (1992); LUDWIK A. TECLAFF, *THE RIVER BASIN IN HISTORY AND LAW* 1 (1967); Ludwik A. Teclaff, *Evolution of the River Basin Concept in National and International Water Law*, 36 NAT. RESOURCES J. 259 (1996).

24. Helsinki Rules, *supra* note 23, art. I.

25. *Id.* art. II. The commentary to Article II provides that: "A drainage basin is considered an indivisible hydrologic unit," meaning that comprehensive consideration is required to effect maximum utilization and development of any portion of its waters. This conclusion is particularly significant when it is recognized that a non-riparian state that supplies substantial quantities of water to a stream is in a position to interfere with the supply of water in that stream. BOGDANOVLE, *supra* note 15, at 357.

26. U.N. Watercourses Convention, *supra* note 13.

27. "Watercourse" is defined in Article 2(a) of the 1997 U.N. Watercourses Convention as being "a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus." *Id.* art. 2(a).

is implicit within the purpose and content of the Convention.<sup>28</sup> In other words, the use, protection, and management of international watercourses, as provided for in article one of the Convention cannot be achieved without regard to land use practices that impact the waters of a drainage basin. Further, such an approach is supported in the substantive provisions of the Convention.

At the basin level, agreements tend to be more explicit. For example, Article 2 of the 1998 Rhine Convention defines its scope as being:

1. the Rhine,
2. the ground-water interlinking with the Rhine,
3. the aquatic and terrestrial ecosystems interacting with the Rhine or whose interaction with the Rhine could be re-established,
4. the Rhine catchment area as far as its pollution adversely affects the Rhine,
5. the Rhine catchment area, as far as it is of importance for issues of flood prevention and defence along the Rhine.<sup>29</sup>

By encompassing the “aquatic and terrestrial ecosystems interacting with the Rhine,” the Convention clearly covers the land-water linkages related to floods. Moreover, with regard to flood prevention and defense, the Convention explicitly identifies the need to account for the Rhine catchment area.

Other contemporary agreements are less specific than the Rhine Convention but generally encompass the drainage basin approach. The 2003 Protocol for the Sustainable Development of Lake Victoria Basin, for example, provides that “Lake Victoria Basin” means “that geographical area extending within the territories of the Partner States determined by the watershed limits of the system of waters, including surface and underground waters flowing into Lake Victoria.”<sup>30</sup> The Protocol goes on to stipulate that the “Partner States have agreed to cooperate in the areas as they relate to the conservation and sustainable utilisation of the resources

28. See *The Law of the Non-Navigational Uses of International Watercourses: Replies of Governments to the Commission’s Questionnaire*, U.N. Doc. A/CN.4/294 & Add. 1 (1976); *The Law of the Non-Navigational Uses of International Watercourses*, U.N. Doc. A/CN.4/314 (1978); *The Law of the Non-Navigational Uses of International Watercourses: Replies of Governments to the Commission’s Questionnaire*, U.N. Doc. A/CN.4/324 (1979); *The Law of the Non-Navigational Use of International Watercourses: Replies of Governments to the Commission’s Questionnaire*, U.N. Doc. A/CN.4/329 & Add. 1 (1980); *The Law of the Non-Navigational Uses of International Watercourses: Replies of Governments to the Commission’s Questionnaire*, U.N. Doc. A/CN.4/352 & Add. 1 (1982).

29. *Convention on the Protection of the Rhine*, Jan. 22, 1998, available at <http://faolex.fao.org/docs/pdf/mul17477.pdf>.

30. *Protocol for the Sustainable Development of the Lake Victoria Basin*, Nov. 29, 2003, art. 1(2), available at <http://faolex.fao.org/docs/pdf/mul41042.pdf>.



of the Basin."<sup>31</sup> Similarly, the 2002 Framework Agreement on the Sava River Basin defines the basin as "the geographical area extended over the territories of the Parties, determined by the watershed limits of the Sava River and its tributaries, which comprises surface and ground waters, flowing into a common terminus."<sup>32</sup>

## 2. Substantive Norms

In terms of flood-related practices and substantive norms, the main issues are whether states have certain rights to the beneficial uses of floodwaters and obligations to protect neighboring states from the negative impacts of floods. For example, there may be a situation in which a downstream state, reliant on transboundary waters for soil fertility in flood plain areas, is affected by the development of dams in the upper reaches of a watercourse. Conversely, dam development upstream might bring much needed benefits to irrigation, recreation, and flood control enterprises in the upstream state. Which of the latter uses should therefore prevail? In this section, three rules of the international law of watercourses are considered: (1) the rule of equitable and reasonable utilization; (2) no significant harm; and (3) ecosystem protection.

Article 5 of the 1997 U.N. Watercourses Convention provides that "Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner."<sup>33</sup> Determining what is equitable involves the balancing of all relevant factors and circumstances within a particular case.<sup>34</sup> Ultimately, the application of

31. *Id.* art. 3.

32. Framework Agreement on the Sava River Basin, *supra* note 19, art. 1(2).

33. U.N. Watercourses Convention, *supra* note 13. The applicability of the rule is described by the ILC as follows:

In many cases, the quality and quantity of water in an international watercourse will be sufficient to satisfy the needs of all watercourse States. But where the quantity or quality of the water is such that all reasonable and beneficial uses of all watercourse States cannot be fully realized, a 'conflict of uses' results. In such a case, international practice recognizes that some adjustments or accommodations are required in order to preserve each watercourse State's equality of right. These adjustments or accommodations are to be arrived at on the basis of equity, and can best be achieved on the basis of specific watercourse agreements.

Int'l Law Comm'n, *Draft Articles on the Law of the Non-Navigational Uses of International Watercourses*, in REPORT OF THE INTERNATIONAL LAW COMMISSION ON THE WORK OF ITS FORTY-SIXTH SESSION, at 98, ¶ 9, U.N. GAOR, 49th Sess., Supp. No. 10, U.N. Doc. A/49/10 (1994), [hereinafter 1994 ILC Draft Articles].

34. U.N. Watercourses Convention, *supra* note 13, art. 6, provides that:

(1) Utilization of an international watercourse in an equitable and reasonable manner within the meaning of article 5 requires taking into account all relevant factors and circumstances, including: (a) Geographic, hydrographic,

the rule of equitable and reasonable utilization should seek to achieve “optimal and sustainable utilization...consistent with adequate protection of the watercourse.”<sup>35</sup>

Where a downstream state relies on transboundary waters for soil fertility in flood plain areas, and hydropower developments are proposed by the upstream state, an equitable solution might be for the upstream state to release floodwaters from its dam system at certain times of the year in order to meet the agricultural needs of the downstream state. In addition, the downstream state might agree to pay compensation to the upstream state for any lost power generation.

The no significant harm rule is another substantive rule that has relevance in the context of floods. As articulated in Article 7 of the 1997 U.N. Watercourses Convention, the no significant harm rule provides that:

1. Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States.
2. Where significant harm nevertheless is caused to another watercourse State, the States whose use causes such harm shall, in the absence of agreement to such use, take all appropriate measures, having due regard for the provisions of articles 5 and 6, in

hydrological, climatic, ecological and other factors of a natural character; (b) The social and economic needs of the watercourse States concerned; (c) The population dependent on the watercourse in each watercourse State; (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse States; (e) Existing and potential uses of the watercourse; (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect; (g) The availability of alternatives, of comparable value, to a particular planned or existing use... (3) The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

35. U.N. Watercourses Convention, *supra* note 13, art. 5(1). The ILC notes that: Attaining optimal utilization and benefits does not mean achieving the “maximum” use, the most technologically efficient use, or the most monetarily valuable use much less short-term gain at the cost of long-term loss. Nor does it imply that the State capable of making the most efficient use of a watercourse – whether economically, in terms of avoiding waste, or in any other sense – should have a superior claim to the use thereof. Rather, it implies attaining maximum possible benefits for all watercourse States and achieving the greatest possible satisfaction of all their needs, while minimizing the detriment to, or unmet needs of, each.

1994 ILC Draft Articles, *supra* note 33, at 97, ¶ 3.

consultation with the affected States, to eliminate or mitigate such harm and, where appropriate, to discuss the question of compensation.<sup>36</sup>

In referring to Articles 5 and 6, section two of Article 7 places the no significant harm rule within the umbrella of equitable and reasonable utilization. In other words, pursuant to Article 7, significant harm may be tolerated in limited circumstances as long as it is deemed both equitable and reasonable.<sup>37</sup> Returning to the example above, the downstream state may be forced to suffer some level of harm to its agricultural uses if the upstream state can claim that its hydropower use is equitable. This type of justification might occur where the upstream state is heavily reliant on hydropower generation within the international watercourse for its national energy supply, and either the agricultural needs of the downstream state can be satisfied by alternative means, or the downstream state has the capacity to mitigate the impacts of hydropower development upstream through building a control dam within its territory.

Another important point about the no significant harm rule is that it places states under an obligation of conduct rather than result. Thus, rather than considering whether significant harm has actually occurred, the test is whether states have taken all the "appropriate measures" so as to prevent that harm. What will be deemed "appropriate" depends on the particular factors and circumstances of the case. States, however, will be under a general obligation to formulate policies to prevent significant transboundary harm, presumably including any flood risk.<sup>38</sup>

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36. U.N. Watercourses Convention, *supra* note 13, art. 7. The ILC notes that "the degree of care expected of a State with a well-developed economy and human and material resources and with highly evolved systems and structures of governance is different from States which are not so well placed." Int'l Law Comm'n, *Draft Articles on Prevention of Transboundary Harm from Hazardous Activities with Commentaries*, at 155, *delivered to the General Assembly*, U.N. Doc. A/56/10 (2001) [hereinafter 2001 ILC Draft Articles].

37. Significant is defined as harm that is:  
[S]omething more than 'detectable' but need not be at the level of 'serious' or 'substantial.' The harm must lead to a real detrimental effect on matters such as, for example, human health, industry, property, environment or agriculture in other States. Such detrimental effects must be susceptible of being measured by factual and objective standards.

*Id.* at 152, ¶ 4. On the relationship between equitable and reasonable utilization, and no significant harm, see ALISTAIR S. RIEU-CLARKE, *INTERNATIONAL LAW AND SUSTAINABLE DEVELOPMENT: LESSONS FROM THE LAW OF INTERNATIONAL WATERCOURSES* 100-32 (2005).

38. Moreover, as highlighted by the ILC, "the degree of care expected of a State with a well-developed economy and human and material resources and with highly evolved systems and structures of governance is different from states which are not so well placed." 2001 ILC Draft Articles, *supra* note 36, at 155, ¶17.

A further rule to consider alongside equitable and reasonable utilization, and the no significant harm rule, is a state's obligation to protect international watercourses' ecosystems. Article 20 of the 1997 U.N. Watercourses Convention provides that "[w]atercourse States shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of international watercourses."<sup>39</sup> What is notable about this provision is that there is no reference to either equitable and reasonable utilization, or the obligation to take all appropriate measures to prevent harm. McCaffrey, Special Rapporteur for the ILC's 1994 Draft Articles on the Law of the Non-Navigational Uses of International Watercourses convention, justifies such an approach by maintaining that:

[A] state's failure to protect the ecosystem of an international watercourse may affect the ecosystem in ways that are not readily perceived, yet whose transboundary effects may become apparent too late to remedy the problem. Species may be lost, flooding may ensue, fish stocks may plummet. This kind of problem can be particularly acute when the watercourse is shared by a number of states, several of which allow activities that modify its ecosystems. Even if these individual modifications are small, they may lead to cumulative impacts that none of the states foresaw individually.<sup>40</sup>

In a similar vein, two international water law experts, Tanzi and Arcari, explain that "under the Convention, ecosystem protection is conceived as inherent in the idea of equitable use."<sup>41</sup> The U.N. Watercourses Convention is, therefore, consistent with an ecosystem approach.<sup>42</sup> While it is uncertain whether the obligation to protect aquatic ecosystems is part of the corpus of international law, there at least appears to be a need to take aquatic ecosystems into account when determining what is equitable and reasonable.<sup>43</sup> Such an approach is particularly relevant in the context of natural floodplains that would presumably be afforded some level of protection under this emerging norm.

### 3. Implementation Instruments

Institutional mechanisms are essential in order to ensure that states cooperate effectively in the implementation of the substantive rules outlined

39. U.N. Watercourses Convention, *supra* note 13, art. 20.

40. STEPHEN C. McCAFFREY, *THE LAW OF INTERNATIONAL WATERCOURSES* 394 (2001).

41. TANZI & ARCARI, *supra* note 13, at 245.

42. See generally, OWEN MCINTYRE, *ENVIRONMENTAL PROTECTION OF INTERNATIONAL WATERCOURSES UNDER INTERNATIONAL LAW* (2007).

43. See Owen McIntyre, *The Emergence of an 'Ecosystem Approach' to the Protection of International Watercourses under International Law*, 13 REV. EUR. COMM. & INT'L ENV'TL L. 1 (2004).

above, and more specifically, in the management of transboundary floods. Central to such cooperation is the establishment of joint institutions. As McCaffrey notes, "management of international watercourse systems through joint institutions is not only an increasingly common phenomenon, but also a form of co-operation between watercourse States that is almost indispensable if anything approaching optimum utilization and protection of the system of waters is to be attained."<sup>44</sup> The 1997 U.N. Watercourses Convention provides that "[w]atercourse States shall, at the request of any of them, enter into consultations concerning the management of an international watercourse, which may include the establishment of a joint management mechanism."<sup>45</sup>

Other procedural norms that support the management of transboundary floods include notification of planned measures, the exchange of data and information, and public participation. The obligation to notify other states of planned measures is widely accepted as representative of customary international law.<sup>46</sup> Pursuant to the 1997 U.N. Watercourses Convention, states must notify of planned measures that "may have a significant adverse effect upon other watercourse States," and accompany such notification with available data and information, including the results of any environmental impact assessment.<sup>47</sup> Likely impacts on the flood regime would be clearly covered by such notification. Obligations to regularly exchange data and information and to ensure public participation in the management of transboundary waters are less well established under

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44. Stephen C. McCaffrey, Special Rapporteur, *Sixth Report on the Law of the Non-Navigational Uses of International Watercourses*, ¶ 7, U.N. Doc. A/CN.4/427 & Corr. 1 & Add. 1 (June 7, 1990).

45. U.N. Watercourses Convention, *supra* note 13, art. 24(1).

46. *Id.* art. 11. The Convention provides that, "[w]atercourse States shall exchange information and consult each other and, if necessary, negotiate on the possible effects of planned measures on the condition of an international watercourse." *Id.* Article 12 further provides that:

Before a watercourse State implements or permits the implementation of planned measures which may have a significant adverse effect upon other watercourse States, it shall provide those States with timely notification thereof. Such notification shall be accompanied by available technical data and information, including the results of any environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures.

*Id.* art. 12.

The Convention further provides details relating to the period of reply to notification, obligations of the notifying state during the period for reply, reply to notification, and absence of reply to notification.

47. *Id.*

international law.<sup>48</sup> The 1992 U.N. Economic Commission for Europe Helsinki Convention for example, obliges riparian parties to ensure that "information on the conditions of transboundary waters, measures taken or planned to be taken to prevent, control and reduce transboundary impact, and the effectiveness of those measures, is made available to the public."<sup>49</sup> Some international watercourse agreements also provide for a level of public participation in decision making procedures. Under the 1997 agreement between Estonia and Russia for the management of Lake Peipsi, "the Parties encourage co-operation between agencies of executive power, local self-governments, scientific and public interest organizations, as well as other institutions in the field of sustainable development and protection of transboundary waters."<sup>50</sup> A further example from Europe can be seen from the Directive on Establishing a Framework for Community Action in the Field of Water Policy (Water Policy Directive), created by the European Parliament and the Council of October 23, 2000, which encourages "the active involvement of all interested parties in the implementation of [the] Directive, in particular in the production, review and updating of the river basin management plans."<sup>51</sup> These examples show that, while international watercourse agreements may promote public participation, such participation is not obligatory.

#### 4. Dispute Settlement Mechanisms

Dispute settlement mechanisms are also an important aspect of the international law of watercourses. States are under an obligation to settle their disputes in a peaceful manner.<sup>52</sup> Various options are available to states

48. See Melvin Woodhouse, *Is Public Participation a Rule of the Law of International Watercourses?*, 43 NAT. RESOURCES J. 137 (2003).

49. Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Mar. 17, 1992, art. 16(1), 31 I.L.M. 1312 (1992) [hereinafter 1992 U.N. ECE Helsinki Convention]. See also Eur. Parliament and the Council of Oct. 23, 2000, Directive 2000/60/EC, *Establishing a Framework for Community Action in the Field of Water Policy*, art. 14, 2000 O.J. (L 327) 1 (EC) [hereinafter EU Water Policy Directive]; Convention on the Cooperation for the Protection and Sustainable Use of the Danube River, art. 14, June 29, 1994, available at <http://www.icpdr.org/icpdr-filed/6787> [hereinafter Danube Convention]; Convention on the Protection and Sustainable Use of Waters of the Spanish-Portuguese Hydrographic Basins, art. 6, Nov. 30, 1998, available at <http://www.fao.org/docrep/008/y5739e/y5739e0a.htm#bm10..1.7.1>.

50. Agreement between the Government of the Estonia Republic and the Government of the Russia Federation on Cooperation in Protection and Sustainable Use of Transboundary Waters, art. 12, Aug. 20, 1997, available at [http://www.cawater-info.net/bk/water\\_law/pdf/estonia\\_russia\\_1997\\_en.pdf](http://www.cawater-info.net/bk/water_law/pdf/estonia_russia_1997_en.pdf).

51. EU Water Policy Directive, *supra* note 49, art. 14(1).

52. The U.N. Charter provides that: "All Members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice, are not endangered." U.N. Charter, art. 2(3). Similarly, the 1997 U.N. Watercourses Convention, *supra*

including negotiation, good offices, mediation, conciliation, arbitration, and adjudication.<sup>53</sup>

5. *To What Extent Do General Rules and Principles Related to International Watercourses Deal with Flood Issues?*

A survey of the general rules and principles related to international watercourses shows that there is at least some general support for flood issues in the corpus of the law. In terms of scope, the law accounts for land-water and surface water-groundwater linkages that are essential in the context of flood issues. In relation to these substantive norms, flood issues can be considered in the broader context of reconciling competing uses and protecting aquatic ecosystems. Institutional, procedural, and dispute settlement mechanisms also form a basic framework by which transboundary flood issues can be taken into account in the broader context of transboundary water management.

### III. FLOOD-SPECIFIC TREATY PRACTICE

#### A. Multilateral Conventions

In addition to the general norms of international law, there are specific treaties that relate to flood management, as well as provisions directly related to floods in more general watercourse agreements. The most direct reference to floods within the 1997 U.N. Watercourses Convention is contained in part five of the Convention which covers harmful conditions and emergency situations. Pursuant to Article 27:

Watercourse States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse States, whether resulting from natural causes or human conduct, such as floods or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification.<sup>54</sup>

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note 13, art. 33(1), provides that: "In the event of a dispute between two or more Parties concerning the interpretation or application of the present Convention, the Parties concerned shall, in the absence of an applicable agreement between them, seek a settlement of the dispute by peaceful means."

53. See Patricia K. Wouters, *Universal and Regional Approaches to Resolving International Water Disputes: What Lessons Learned from State Practice?*, in RESOLUTION OF INTERNATIONAL WATER DISPUTES 111 (Int'l Bureau of the Permanent Court of Arbitration ed., 2003).

54. U.N. Watercourses Convention, *supra* note 13.

In the context of floods, such measures might include the construction of reservoirs, afforestation, or an improved range of management practices.<sup>55</sup> The International Law Commission recognized that:

The kinds of measures that may be taken under article 27 are many and varied. They range from the regular and timely exchange of data and information that would be of assistance in preventing and mitigating the conditions in question, to taking all reasonable steps to ensure that activities in the territory of a watercourse State are so conducted as not to cause conditions that may be harmful to other watercourse States. They may also include the holding of consultations concerning the planning and implementation of joint measures, whether or not involving the construction of works, and the preparation of studies of the efficacy of measures that have been taken.<sup>56</sup>

Article 27 is complemented by an obligation under Article 28 relating to emergency situations.<sup>57</sup> Pursuant to Article 28, states must, "without delay and by the most expeditious means available, notify other potentially affected States and competent international organizations of any emergency originating within its territory."<sup>58</sup> Additionally, to follow the Convention a state must "immediately take all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate harmful effects of the emergency."<sup>59</sup> In terms of forward planning, states are also obliged to "jointly develop contingency plans for responding to emergencies, in cooperation, where appropriate, with other potentially affected States and competent international organisations."<sup>60</sup>

In addition to the 1997 U.N. Watercourses Convention, there are around 140 treaties that address, at least in part, the issue of disaster

55. 1994 ILC Draft Articles, *supra* note 33, at 127.

56. *Id.* at 129.

57. An "emergency" situation is defined under Article 28(1) of the U.N. Watercourses Convention, *supra* note 13, as being "a situation that causes, or poses an imminent threat of causing, serious harm to watercourse States or other States and that results suddenly from natural causes, such as floods, the breaking up of ice, landslides or earthquakes, or from human conduct, such as industrial accidents."

58. "Competent international organizations" might include joint international watercourse institutions. In many cases such institutions would be the most appropriate organization to develop early warning systems and coordinate response efforts. *See* 1994 ILC Draft Articles, *supra* note 33, at 128.

59. U.N. Watercourses Convention, *supra* note 13, art. 28(3).

60. *Id.* art. 28(4).



response.<sup>61</sup> A survey by the International Federation of Red Cross and Red Crescent Societies concluded that, while there were a large number of treaties in this field, international disaster response law remained disparate.<sup>62</sup> A number of areas were considered to be inadequately regulated, including entry requirements, working permits, freedom of movement, status of personnel and specific immunities, recognition of professional expertise, information exchange, treatment of consignments, transport in the requesting state, customs tariffs, and the distribution and use of relief.<sup>63</sup>

## B. Regional Agreements

Two regional regimes have developed specific provisions related to floods, the European Union (EU) and the United Nations Economic Commission for Europe (U.N. ECE).

### 1. 1992 U.N. ECE Helsinki Convention

In 1992, the U.N. ECE adopted the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, which entered into force in 1996 upon ratification by 35 parties.<sup>64</sup> This framework Convention has been influential in strengthening the legal and institutional framework for the management of transboundary waters throughout Europe; and in particular, within Eastern Europe, the Caucasus, and Central Asia since the break-up of the Union of Soviet Socialist Republics.<sup>65</sup> The Convention has been enhanced by the adoption of two supplementary protocols, the 1999 Protocol on Water and Health<sup>66</sup> and the 2003 Protocol on

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61. INT'L FED'N OF RED CROSS & RED CRESCENT SOCIETIES, INTERNATIONAL DISASTER RESPONSE LAW, PRINCIPLES AND PRACTICE: REFLECTIONS, PROSPECTS AND CHALLENGES (2003), available at <http://www.ifrc.org/what/disasters/idrl/research/publications.asp>.

62. *Id.* at 38-39.

63. *Id.*

64. 1992 U.N. ECE Helsinki Convention, *supra* note 49.

65. The U.N. ECE Helsinki Convention has been highly influential in fostering the adoption by parties of bilateral or multilateral sub-regional and basin-specific agreements, including treaties on the Danube, Rhine, Meuse and Scheldt, Lake Peipsi, the shared waters between Russia and Kazakhstan, and those between Russia and the Ukraine. See Patricia K. Wouters & Sergei Vinogradov, *Analysing the ECE Water Convention: What Lessons for Regional Management of Transboundary Water Resources?*, 2003/2004 Y.B. INT'L CO-OP ON ENV'T & DEV. 55; Patricia K. Wouters, *What Lessons from Europe? A Comparative Analysis of the Legal Frameworks that Govern Europe's Transboundary Waters*, 36 ENV'T'L L. REP. (Envt. Law Inst.) 10,290 (2006).

66. Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Jun. 17, 1999, available at [http://www.unec.org/env/water/text/text\\_protocol.htm](http://www.unec.org/env/water/text/text_protocol.htm).

Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters.<sup>67</sup> In addition, the parties to the Convention have agreed on numerous policy documents that support its implementation.<sup>68</sup> Furthermore, the Convention is implemented as part of a wider U.N. ECE environmental program under which the following regional environmental agreements have been adopted: the 1991 Convention on Environmental Impact Assessment in a Transboundary Context,<sup>69</sup> the 1992 Convention on the Transboundary Effects of Industrial Accidents,<sup>70</sup> and the 1998 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.<sup>71</sup>

Pursuant to the 1992 Convention, contracting parties are obligated to "take all appropriate measures to prevent, control and reduce any transboundary impact."<sup>72</sup> To implement the substantive provisions of the Convention, riparian parties must enter into bilateral or multilateral agreements or other arrangements or adapt existing agreements in order to align their state's practice with the provisions of the Convention.<sup>73</sup> Also, riparian parties are obliged to establish joint bodies for watercourses covered by the Convention.<sup>74</sup>

67. Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters, May 21, 2003 (not yet in force), available at <http://www.unece.org/env/civil-liability/protocol.html>.

68. See, e.g., ECONOMIC COMMISSION FOR EUROPE CONVENTION ON THE PROTECTION AND USE OF TRANSBOUNDARY WATERCOURSES AND INTERNATIONAL LAKES, STRATEGIES FOR MONITORING AND ASSESSMENT OF TRANSBOUNDARY RIVERS, LAKES AND GROUNDWATERS (2006), available at <http://www.unece.org/env/water/publications/documents/StrategiesM&A.pdf>.

69. Convention on Environmental Impact Assessment in a Transboundary Context, Feb. 25, 1991, 30 I.L.M. 800 (1991).

70. Convention on the Transboundary Effects of Industrial Accidents, Mar. 17, 1992, available at <http://www.unece.org/env/teia/text.htm>.

71. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, June 25, 1998, 38 I.L.M. 517 (1999).

72. 1992 U.N. ECE Helsinki Convention, *supra* note 49, art. 2(1). "Transboundary Impact" is defined under Article 1.2 of the Convention as:

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

73. *Id.* art. 9(1).

74. *Id.* art. 9(2).

With regard to emergency situations, Article 14 of the Convention provides that states must "without delay inform each other about any critical situation that may have transboundary impact."<sup>75</sup> Riparian states are also obliged to "set up, where appropriate, and operate coordinated or joint communication, warning and alarm systems with the aim of obtaining and transmitting information."<sup>76</sup>

In addition to the general provisions of the Convention, the U.N. ECE has adopted Guidelines on Sustainable Flood Prevention (Guidelines) and Model Provisions on Transboundary Flood Management (Model Provisions).<sup>77</sup> The Guidelines seek "to prevent, control and reduce the adverse impact of flood events on human health and safety, on valuable goods and property, and on the aquatic and terrestrial environment."<sup>78</sup> The Model Provisions are designed "to be used as part of either a general bilateral or multilateral normative instrument on transboundary water issues or a flood-specific one among riparian States, in order to address transboundary flood prevention, protection and mitigation and enhance preparedness thereto."<sup>79</sup>

Consistent with the integrated flood management concept, the Guidelines recognize the need for a holistic approach to flood management that accounts for the whole river basin, and thus require international cooperation and interdisciplinary planning at the basin level. In accordance with the 1992 Convention, the Guidelines advocate the need to establish joint bodies, such as international river commissions, that should incorporate flood prevention and protection issues within management activities.<sup>80</sup> According to both the Guidelines and the Model Provisions, joint bodies should be responsible for developing long-term flood management strategies and measures that cover transboundary river basins. Such strategies and measures should include the exchange of flood forecasting data and models; the preparation of joint surveys, studies, "flood plain maps, flood risk assessments and flood risk maps"; the exchange of relevant national data and documentation; and the development of

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75. *Id.* art. 14.

76. *Id.*

77. U.N. Econ. Comm'n for Eur., Guidelines on Sustainable Flood Prevention, at 3-10, U.N. Doc. MP.WAT/2000/7Annex (Jan. 14, 2000), available at <http://www.unece.org/env/water/publications/documents/guidelinesfloode.pdf> [hereinafter Guidelines on Sustainable Flood Prevention]; U.N. Econ. Comm'n for Eur., Model Provisions on Transboundary Flood Management, at 6, U.N. Doc. ECE/MP.WAT/2006/4 (Aug. 29, 2006) available at <http://daccessdds.un.org/doc/UNDOC/GEN/G06/250/77/PDF/G0625077.pdf> [hereinafter Model Provisions on Transboundary Flood Management].

78. Guidelines on Sustainable Flood Prevention, *supra* note 76, at 3.

79. Model Provisions on Transboundary Flood Management, *supra* note 76, at 3.

80. *Id.* at 6.

comprehensive flood action plans.<sup>81</sup> In relation to emergency situations and notification, the Guidelines and Model Provisions call for parties to inform each other, without delay, of "any critical situation likely to cause flooding in the other Parties' territory."<sup>82</sup> Riparian parties are also obliged to establish "joint communication, warning and alarm systems."<sup>83</sup> During critical situations, the Guidelines further stipulate that riparian parties should draft and agree upon procedures for mutual assistance which outline "formalities to facilitate the travel of flood response personnel from abroad (whether by plane, boat or on land) during flood events."<sup>84</sup>

In line with the integrated flood management concept, the Model Provisions also highlight the need to incorporate environmental requirements into joint flood management strategies, noting that states must "take, to the extent possible, all appropriate measures to maintain, improve and restore the natural function of the watercourse; protect and restore water-related ecosystems; ensure that flow management takes into account the natural flow of solid matter; enhance interaction between river, groundwater and alluvial areas; and conserve, protect and reactivate alluvial areas as natural floodplains."<sup>85</sup>

## 2. EU Water Policy Directive and Floods Directive

A further example of the development of flood-specific instruments at the regional level is in the context of EU Water Policy Directive.<sup>86</sup> The purpose of this framework legislation, set out in Article 1, is:

[T]o establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which:

- (a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems;
- (b) promotes sustainable water use based on a long-term protection of available water resources;
- (c) aims at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances;

81. *Id.* at 6 (provision 3).

82. *Id.* at 4.

83. *Id.*

84. Guidelines on Sustainable Flood Prevention, *supra* note 76, at 8.

85. Model Provisions on Transboundary Flood Management, *supra* note 76, at 7-8.

86. EU Water Policy Directive, *supra* note 49.

- (d) ensures the progressive reduction of pollution of groundwater and prevents its further pollution, and
- (e) contributes to mitigating the effects of floods and droughts.<sup>87</sup>

While the mitigation of the effects of floods is specifically mentioned as a purpose of the Water Policy Directive, few of its provisions directly refer to floods. The EU, however, has complemented the Water Policy Directive with a Floods Directive.<sup>88</sup> The aim of the Floods Directive "is to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community."<sup>89</sup> The Floods Directive focuses on three areas: (1) preliminary flood risk assessment; (2) flood maps; and (3) flood risk management plans. Like the Water Policy Directive, both national and international river basins within the territory of the EU are covered by the Flood Directive's provisions.

In the context of flood risk assessment, member states are obligated to conduct a preliminary assessment which should include maps of the river basin district, a description of past floods which have had a significant adverse impact, and the likely adverse consequences of future floods.<sup>90</sup> Following the preliminary flood risk assessment, member states must identify those river basin districts where "potential significant flood risks exist or might be considered likely to occur."<sup>91</sup> The Floods Directive also provides that preliminary flood assessments must be made available to the public.<sup>92</sup>

For areas where a potential significant flood risk exists or might be considered likely to occur, member states must prepare flood hazard maps and flood risk maps.<sup>93</sup> Flood hazard maps should contain information on the potential extent of floods, water depths or water level, and flow velocity or relevant water flow, where appropriate.<sup>94</sup> Flood risk maps should show the potential adverse consequences associated with likely floods, in terms of, inter alia, inhabitants, economic activities, and installations affected.

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87. *Id.*

88. Eur. Parliament and the Council of Oct. 23, 2007, Directive 2007/60/EC, *On the Assessment and Management of Flood Risks*, 2007 O.J. (L 288) 27 [hereinafter Floods Directive].

89. *Id.* art. 1.

90. *Id.* art. 4(2).

91. *Id.* art. 5(1).

92. *Id.* art. 10(1).

93. *Id.* art. 6(1).

94. Floods Directive, *supra* note 88, art. 6(4).

Under the Floods Directive, member states are obliged to ensure that the maps are made available to the public.<sup>95</sup>

Finally, member states are required to establish flood risk management plans.<sup>96</sup> Active involvement of "interested parties" in the production, review, and updating of the flood risk management plans must be encouraged by the member states, and the plans must be made available to the public.<sup>97</sup> Management plans should include conclusions made after the first preliminary flood risk assessment, flood hazard and flood risk maps, a description of the appropriate objectives of flood risk management,<sup>98</sup> and a summary of measures and their aims to achieve the appropriate objectives of flood risk management.<sup>99</sup> The flood risk management plan should also include: "(1) a description of the prioritisation and the way in which progress in implementing the plan will be monitored; (2) a summary of public information and consultation measures/action taken; and (3) a list of competent authorities and, as appropriate, a description of the coordination process within any international river basin district."<sup>100</sup>

While the Floods Directive is applicable to both national and transboundary waters lying within the territory of the EU, some measures specifically address the transboundary context. The preamble to the Floods Directive highlights the importance of cooperation between states over flood issues while also making reference to the 1992 U.N. ECE Helsinki Convention.<sup>101</sup> In assessing flood risks within international river basin districts, member states are required to exchange relevant information between competent authorities concerned with such flood risks.<sup>102</sup> In addition, member states must cooperate in designating international river

95. *Id.* art. 14.

96. *Id.* art. 7(1).

97. *Id.* art. 10(2).

98. *Id.* art. 7(2). This article provides that: "Member States shall establish appropriate objectives for the management of flood risks...focusing on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity, and, if considered appropriate, on non-structural initiatives and/or on the reduction of the likelihood of flooding." *Id.*

99. *Id.* annex A(I).

100. Floods Directive, *supra* note 88, annex A(II).

101. *Id.* preamble, ¶ 6. The preamble reads:

Effective flood prevention and mitigation requires, in addition to coordination between Member States, cooperation with third countries. This is in line with Directive 2000/60/EC and international principles of flood risk management as developed notably under the United Nations Convention on the protection and use of transboundary water courses and international lakes, approved by Council Decision 95/308/EC, and any succeeding agreements on its application.

*Id.*

102. *Id.* art. 4(3).

basin districts where "potential significant flood risks exist or might be considered likely to occur."<sup>103</sup> Member states must also cooperate in the prior exchange of information in preparing flood hazard maps and flood risk maps for international river basin districts.<sup>104</sup> Further, "Member States shall ensure that one single [international] flood risk management plan, or a set of flood risk management plans coordinated at the level of the [international] river basin district is produced."<sup>105</sup> Where the production of such plans is not possible, however, member states are still obligated to "produce flood risk management plans covering at least the parts of the international river basin district falling within their territory, as far as possible coordinated at the level of the international river basin district."<sup>106</sup> The Floods Directive also encourages member states to adopt a single international flood risk management plan or a set of flood risk management plans for international river basins extending beyond the borders of the EU.<sup>107</sup> Even where the production of such plans is not possible, however, member states are still obliged to produce a flood risk management plan for their section of the river basin district. Regardless of the administrative arrangements for drafting the flood risk management plans, member states must ensure that measures adopted pursuant to the plans in one member state do not cause a significant "increase [in] flood risks upstream or downstream [in] other countries in the same river basin or sub-basin" unless such measures have been coordinated and agreed upon amongst the member states.<sup>108</sup>

### C. Basin and Bilateral Agreements

While there are numerous international agreements relating to transboundary waters, few specifically relate to floods. Of those few instruments relating to floods, most focus on flood protection and control, rather than management *per se*.<sup>109</sup> For example, under the 1935 Agreement between the United States and Canada regarding the level of Lake Memphremagog, the parties agreed "[t]hat during times of flood the sluiceways of the dam shall be sufficiently opened to ensure that the

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103. *Id.* art. 5(1).

104. *Id.* art. 6(2).

105. Floods Directive, *supra* note 88, art. 8(1).

106. *Id.* art. 8(2).

107. *Id.* art. 8(3).

108. *Id.* art. 7(4). In addition, the flood risk management plans must, where available, provide "a description of the methodology, defined by the Member States concerned, of cost-benefit analysis used to assess measures with trans-national effects", *Id.* annex A(I)(5).

109. See Ludwik A. Teclaff, *Treaty Practice Relating to Transboundary Flooding*, 31 NAT. RESOURCES J. 109, 109 (1991).

overflow from the lake shall be unobstructed by the dam, the flood water drawn off, and the water level in the lake reduced to the normal regulated level of 682.70 as rapidly as possible.”<sup>110</sup>

A further set of “framework” treaties oblige the contracting parties to develop further provisions relating to floods after the adoption of the treaty. The 2002 Agreement on the Incomati and Maputo provides that “[t]he Parties undertake to co-ordinate their actions within six months to one year and to develop measures to mitigate the effects of droughts and floods.”<sup>111</sup> Interestingly, the agreement does not differentiate between the beneficial and the detrimental aspects of floods, although it could be implied from the text that the focus is on mitigating the negative impacts of floods. A similar approach is taken by the 1998 Luso-Spanish Convention provides that “[t]he Parties shall co-ordinate their actions and create exceptional mechanisms to minimize the effects of floods.”<sup>112</sup> However, despite the latter Convention’s adoption in 1998, no flood mechanisms have yet been developed.

In contrast to the approach adopted by the above mentioned agreements, the 1998 Convention on the Protection of the Rhine notes that a key aim is the “sustainable development of the Rhine ecosystem, in particular through [inter alia]...conserving, protecting and reactivating

110. Exchange of Notes regarding the level of Lake Memphremagog, Can.-US, Sept. 20 & Nov. 6, 1935, available at <http://www.faolex.fao.org/waterlex>. Other examples include the Agreement concerning Red River Flood Control, Can.-US, Aug. 30, 1998, available at <http://www.transboundarywaters.orst.edu/projects/internationalDB.html>; Treaty between Switzerland and Austria for the Regulation of the Rhine from the Mouth of the Ill to Lake Constance, Switz-FRG, Apr. 10, 1954, available at <http://www.transboundarywaters.orst.edu/projects/internationalDB.html>; Convention Concerning Measures to Prevent Floods and to Regulate the Water Regime in the Area of the Frontier River Tisza, Hung.-USSR, June 9, 1950, available at <http://www.faolex.fao.org/waterlex>; Convention Concerning Measures to Prevent Floods and to Regulate the Water Regime of the River Prut, Rom.-USSR, Dec. 25, 1952, available at <http://www.faolex.fao.org/waterlex>; Agreement Regarding a Common Dike Administration in the Manwerder Plain, FRG-Pol., Jan. 27, 1923, available at <http://www.transboundarywaters.orst.edu/projects/internationalDB.html>; Agreement on Flood Warning for the Catchment Basin of the Moselle, Fr.-FRG-Lux., Oct. 1, 1987, available at <http://www.transboundarywaters.orst.edu/projects/internationalDB.html>; Convention Concerning the Regularisation of Lake Lugano, It.-Switz, Sept. 17, 1925, available at <http://www.faolex.fao.org/waterlex>; Agreement to Regulate the Level of Lake of the Woods, Can.-US., Feb. 24, 1925, available at <http://www.faolex.fao.org/waterlex>; Convention for Water Supply and Flood Control in the Souris River Basin, Can.-US, Oct. 26, 1989, available at <http://www.faolex.fao.org/waterlex>.

111. Tripartite Interim Agreement for Co-operation on the Protection and Sustainable Utilisation of the Water Resources of the Incomati and Maputo Watercourses, art. 10(1), Aug. 29, 2002, available at [www.dwaf.gov.za/Docs/Other/IncoMaputo/INCOMAPUTO%20AGREEMENT%2029%20AUGUST%202002.doc](http://www.dwaf.gov.za/Docs/Other/IncoMaputo/INCOMAPUTO%20AGREEMENT%2029%20AUGUST%202002.doc).

112. Convention on the Protection and Sustainable Use of Waters of the Spanish-Portuguese Hydrographic Basins, *supra* note 49, art. 18.



alluvial areas as natural floodplains<sup>113</sup> and “general flood prevention and protection, taking account of ecological requirements.”<sup>114</sup> In relation to imminent flooding, states are also bound to immediately inform the International Commission for the Protection of the Rhine and other contracting parties of potential liability, in accordance with warning and alert plans coordinated by the Commission.<sup>115</sup> Under the auspices of the Convention, the parties have adopted the Rhine Action Plan on Floods, which is designed to be fully implemented by 2020.<sup>116</sup> The plan identifies four areas for action: (1) the reduction of damage risks; (2) the reduction of flood levels; (3) increased flood awareness; and (4) the improvement of a flood announcement system. The International Commission for the Protection of the Rhine places particular emphasis on non-structural flood measures, including flood preparedness, land use control, flood proofing construction, and emergency planning.<sup>117</sup>

The Danube Convention also provides an example where flood measures have been developed after the adoption of the instrument.<sup>118</sup> An objective of the Danube Convention is for the contracting parties to “strive at achieving the goals of a sustainable and equitable water management, including the conservation, improvement and the rational use of surface waters and ground water in the catchment area as far as possible.”<sup>119</sup> Additionally, the contracting parties must “make all efforts to control the hazards originating from...floods.”<sup>120</sup> Pursuant to the Convention, contracting parties are obliged to establish joint programs for monitoring the conditions of the Danube catchment as a basis for assessing the transboundary impacts of, *inter alia*, floods.<sup>121</sup> The Danube Convention also requires the parties to “provide for coordinated or joint communication, warning and alarm systems.”<sup>122</sup> Each state must establish a competent authority for this coordination, which is responsible for immediately notifying downstream Danube states and the Danube Commission of likely impacts of floods.

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113. Convention on the Protection of the Rhine, *supra* note 29, art. 3(1)(c).

114. *Id.* art. 3(4).

115. *Id.* art. 5(6).

116. Int'l Comm'n for the Protection of the Rhine, Action Plans on Floods, Jan. 22, 1988, <http://www.iksr.org/index.php?id=81> (last visited Jan. 30, 2009).

117. DR. THOMAS EGLI, INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE RHINE, NON-STRUCTURAL FLOOD PLAIN MANAGEMENT – MEASURES AND THEIR EFFECTIVENESS (2002), available at [http://www.iksr.org/fileadmin/user\\_upload/documents/rz\\_iksr\\_engl.pdf](http://www.iksr.org/fileadmin/user_upload/documents/rz_iksr_engl.pdf).

118. Danube Convention, *supra* note 49.

119. *Id.* art. 2(1).

120. *Id.*

121. *Id.* art. 9.

122. *Id.* art. 16(1).

In 2004, the contracting parties adopted the Action Programme for Sustainable Flood Protection in the Danube River Basin (Action Programme).<sup>123</sup> The Action Programme serves as a framework to harmonize action plans of the Danube basin states. In so doing, the basin-wide Action Programme lays out the principles and objectives for sustainable flood protection. As can be gleaned from its title, the focus of the Action Programme is broader than flood control. As a basic principle of flood management, the Action Programme realizes that “[f]lood events are part of nature. They have always existed and will continue to exist. Floods can be hazardous, but are also a very important ecological factor for riverine ecosystems and species.”<sup>124</sup> The Action Programme calls for joint action between government, municipalities and stakeholders; and particularly joint action relating to providing and exchanging appropriate, timely, and reliable information related to flood warnings.

The Action Programme sets out general objectives relating to networking existing national flood reporting and forecast systems, and outlines several categories of measures designed to reduce the risk of flooding. In relation to flood reduction, natural retention is promoted, “based on improving river basin land-use, preventing rapid runoff both in rural and urban areas, and improving a trans-national effort to restore rivers’ natural floodplains.”<sup>125</sup> The Action Programme recognizes the cross-benefits of retaining natural flood plains, such as maintaining biodiversity, frequently recharging underground aquifers, improving the availability of cleaner drinking waters, and providing additional areas for recreation and tourism.<sup>126</sup> The need for structural measures to defend against extreme events is also recognized in the Action Programme. These structural measures should primarily focus on “the protection of human health and safety and of valuable goods and property.”<sup>127</sup> Further, the Action Programme sets out implementation mechanisms, including financial resources, the implementation schedule, and the roles and responsibilities of key actors.<sup>128</sup>

Finally, the 1995 Mekong Agreement provides a further example of an agreement that has evolved to provide detailed activities relating to flood management.<sup>129</sup> The agreement obliges contracting states to

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123. INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE DANUBE RIVER, ACTION PROGRAMME FOR SUSTAINABLE FLOOD PROTECTION IN THE DANUBE RIVER BASIN (2004), <http://www.icpdr.org/icpdr-pages/floods.htm> (last visited Feb. 26, 2009).

124. *Id.* at 13.

125. *Id.* at 15.

126. *Id.*

127. *Id.*

128. *Id.* at 23–25.

129. Mekong Agreement, *supra* note 18.

“cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin including, but not limited to...flood control...in a manner to optimize the multiple-use and mutual benefits of all riparians and to minimize the harmful effects that might result from natural occurrences and man-made activities.”<sup>130</sup> In response to the extreme floods of 2000 in the lower Mekong basin, the Mekong River Commission established a Flood Management and Mitigation Programme (Flood Programme) that commenced operation in January 2005.<sup>131</sup> The Flood Programme of the Mekong has five components: (1) the establishment of a regional flood center; (2) structural measures and flood proofing; (3) mediation of transboundary flood issues; (4) flood emergency management strengthening; and (5) land management.<sup>132</sup> The Flood Programme seeks to adopt a mix of strategies among the five components adopted above, thus seeking to promote an integrated approach.

#### D. Current Status of Treaty Practice Related to Flood Management

A survey of current treaty practice shows that at the global level the 1997 U.N. Watercourses Convention only provides a general obligation on states to: first, adopt “all appropriate measures” to prevent or mitigate the impact of floods, including the regular and timely exchange of data and information; second, to notify of emergency situations; and third, to jointly develop contingency plans. As can be expected from a global framework agreement, however, the specific details of how such measures should be implemented are not included in the Convention.

Although there are approximately 140 treaties dealing with disaster response, the law remains disparate. While it appears that, at least at the global level, there is no comprehensive legal framework for the management of transboundary floods, some lessons could perhaps be learned from regional contexts. In Europe, two recent legal regimes have sought to develop a more comprehensive approach to flood management, the 1992 U.N. ECE Helsinki Convention and the EU Floods Directive. Both regimes emphasize the need to enhance cooperation between watercourse states to address flood issues by establishing joint bodies; developing communication, warning and alarm systems; exchanging flood forecasting data and models; and creating joint surveys, studies, flood plain maps, flood risk assessments, management strategies, and action plans.

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130. *Id.* art. 1.

131. Mekong Programme, [http://mrcmekong.org/mekong\\_program\\_ceo.htm](http://mrcmekong.org/mekong_program_ceo.htm) (last visited Feb. 26, 2009).

132. *Id.*

Another key aspect of both regimes is the recognition of a need to improve and restore the natural function of the watercourse as a means to maximize the benefits and mitigate the negative impacts of floods. Finally, both regimes, especially the EU Floods Directive, strongly emphasize the importance of public participation in flood management.

Of existing flood basin and bilateral agreements, few are dedicated entirely to flood issues, and most emphasize flood prevention rather than broader management issues. Although limited, there are useful examples of framework agreements at the basin level that have developed more specific measures related to flood management. Most notable are the Rhine and Danube, and their related flood action plans, which emphasise the need to adopt a basin approach to the management of floods. Both plans also emphasize the need for a mixture between structural and non-structural measures, as well as ensuring public participation in restoring river's natural floodplains.

#### IV. WORK OF THE INTERNATIONAL LAW ASSOCIATION

In addition to general international law relating to international watercourses, and flood specific treaty practice, the ILA adopted Rules on Flood Control in 1972.<sup>133</sup> As the title suggests, the International Law Association adopted a narrower approach than the integrated flood management principle, focusing primarily on flood control. Indeed, "floods" are defined by the International Law Association as "the rising of water levels which would have detrimental effects on life and property in co-basin States."<sup>134</sup> Furthermore, "flood control" includes "taking all appropriate steps to protect land areas from floods or to minimize damage therefrom."<sup>135</sup> Thus, only the negative aspects of flooding are covered by the rules.

According to the rules proposed by the International Law Association, basin states should consider the following cooperative measures:

- (a) collection and exchange of relevant data;
- (b) preparation of surveys, investigations and studies and their mutual exchange;
- (c) planning and designing of relevant measures;
- (d) execution of flood control measures;
- (e) operation and maintenance of works;

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133. FLOOD CONTROL, ILA REPORT OF THE FIFTY-FIFTH CONFERENCE, NEW YORK, 1972, in BOGDANOVIC, *supra* note 15, at 147.

134. *Id.* at 150 (citing art. 1(1)).

135. *Id.* (citing art. 1(2)).

- (f) flood forecasting and communication of flood warnings;
- (g) setting up of a regular information service charged to transmit the height of water levels and the discharge quantities.<sup>136</sup>

In addition to suggesting the appropriate cooperative measures for flood control, the rules make a recommendation for how the costs and responsibilities of establishing such measures should be allocated.<sup>137</sup> The 1972 rules also cover the issue of liability for damage caused by flood occurrences. Where the damage is substantial, and the state has acted or failed to act in a way that "could be reasonably expected under the circumstances," then liability will arise.<sup>138</sup>

## V. CONCLUSION

Numerous human and environmental factors threaten to increase the likelihood and magnitude of flood events throughout the world. Unless managed in an appropriate manner, such events pose a serious threat to economic and social development in many parts of the world.

In the context of international watercourses, poorly managed floods can increase tensions between states. Given that nearly one-half of the world's land surface is within international river basins, and most states share such waters, the need to establish legal frameworks that account for transboundary flood events is evident.

At the global level, though the general rules and principles related to international watercourses provide a basic framework by which states cooperate over flood issues, more specific law relating to flood management is needed. In particular, enhancements are needed in the institutional and procedural rules related to flood management for many international watercourses around the world, including the establishment of joint bodies and joint communication, warning, and alarm systems. There is also a need to provide mechanisms for the exchange of data and information, flood risk assessment, flood management strategies, action plans, and public participation. Another important need is the enhancement of the natural function of the watercourse as a means to maximize the benefits of floods and mitigate the negative impacts of floods.

At the regional level, both the U.N. ECE and the EU provide useful lessons on how such flood specific laws can be developed. Similarly, some treaty practices, such as the Rhine and the Danube, provide valuable

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136. *Id.* at 151.

137. *Id.* at 187 (citing art. 6(1)).

138. *Id.* at 189 (citing art. 7)).

guidance on how specific flood measures can be developed at the basin level. The U.N. Environmental Programme recently reported that only one third of the world's transboundary basins have established treaties or basin commissions.<sup>139</sup> Much more effort is needed to adopt new agreements that take flood issues into account, therefore, and where necessary, develop existing agreements.

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139. GLOBAL INTERNATIONAL WATER ASSESSMENT, *supra* note 12.

