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The Analysis of the Rules on Transboundary Water Pollution

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Témavezetői ajánlás dr. Bujdos Ágnes *The Analysis of the Rules on Transboundary Water Pollution* c. doktori értekezéséhez

Bujdos Ágnes meghatározó kutatói célkitűzése az, hogy munkájában a szennyezés fogalmát (illetve ahhoz a kapcsolódóan más kifejezések, úgymint különösen a vízvédelem tárgyát, tartalmát jelölő szavak jelentését), az annak meghatározására, tartalmának körülírására tett (nemzetközi vízjogi) jogalkotási és kommentátori kísérleteket (a releváns szakirodalomra is reflektálva) áttekintse, és a szabályozás más tartalmi elemeivel ütköztetve értékelje.

Ez tehát ebben a megközelítésben egy elsődlegesen jogdogmatikai módszeren alapuló disszertáció, amely nem törekszik a teljes, érintett joganyag, minden vonatkozásának feltárására. A munka nyersanyaga, illetve egyben vizsgálati tárgya angol nyelven született, és (a jogvitákban) ezen a nyelven is alkalmazzák. A dolgozat tehát nem is íródhatott volna más nyelven.

A dolgozat – egyes részterületeken eredeti kutatási eredmények megfogalmazásával, míg mások esetén a szakirodalom szintetizálása, kutatási tárgyának új és átfogó megvilágításba helyezése révén, illetve különösen komplex megközelítésére tekintettel – hiánypótló, nem csak hazai, hanem nemzetközi viszonylatban is.

A bevezetésben a szerző részletesen tisztázza a vizsgált tárgykör tematikai kereteit, témaválasztásának az indokait. A kutatóhelyi vita eredményeit figyelembe véve jelentősen gazdagodott az első fejezet, nagyobb részben teljesen új, kisebb részben a kidolgozáshoz tartozó fejezetekből előrevett elemekkel, aminek révén közérthető formában és a maga komplexitásában ismerkedhetünk meg a problémafelvetéssel és a szerző kutatási módszerének a részleteivel is.

A dolgozat összetettsége komoly szakmai kihívást jelentett, hiszen pl. a tengerek és az országhatárt képező/metsző vizek szennyezésével kapcsolatos problémák részletesebb tárgyalása mellett a szárazföldi eredetű tengervíz-szennyezés, jellemzően sajátos megközelítéssel élő szabályozására, szóhasználatára is rá kellett mutatnia a szerzőnek. Az olvasó szempontjából, a gondolatmenet követhetősége érdekében fontos ezért, hogy a szerző kis, egymásra helyezett lépésekben halad előre, és a gondolatmenet egyes elemeinek az összekapcsolásakor végig fogja az olvasó kezét.

A dolgozat tudományközi megközelítéssel él, megfelelően annak, hogy egy környezetvédelmi jogi tárgyú munkának a műszaki-természettudományi háttérrel is számolnia kell. Ez egyfelől azt jelenti, hogy egy külön fejezetben áttekinti a víz, mint „természeti erőforrás" sajátosságait, amelyekre a szabályozásnak is tekintettel kell lennie. Másfelől ez a szemlélet a dolgozat többi részében is nyomon követhető (csak így volt kidomborítható, pl. a szennyezés fogalmának rugalmassága, s az eltérő értelmezési lehetőségek iránti igény; többek közt az energia-kibocsátások körében, amelyek alatt az

édesvizek esetében a hőkibocsátást is értjük, ami ugyanakkor a tengerek esetén kevésbé releváns, miközben pl. a tengerek esetén a zajterhelés releváns).

A dolgozat nemzetközi jogi dogmatikai elemzései nem korlátozódnak a tisztán környezetvédelmi kérdésekre, hogy pl. melyek is az államok kötelezettségei a vizek védelmében. Így, a szerző tisztában van a téma emberi jogi vetületével (vízhez való jog, őslakos népek jogai, stb.) és figyelembe veszi a vizek nemzetközi jogi státuszát is (hiszen a vizek nemzetközi jogilag releváns szennyezésének megítélésére kihat, pl. hogy az adott víz határvíznek minősül-e, s ha igen, pontosan hol húzódik az államhatár).

Ha csak a tiszai ciánszennyezés történetére gondolunk, akkor is nyilvánvaló, hogy a dolgozatban felmerülő kérdések nem csupán jogtudományi szempontból érdekesek, hanem (pl. a vízkörforgás révén) az olyan kontinentális országok számára, mint hazánk, gyakorlati jelentőséggel is bírnak.

A meghatározó, univerzális dokumentumok mellett regionális egyezményeket is megvizsgált a szerző. Jóllehet, számtalan kétoldalú egyezmény és a bírói gyakorlat is adalékul szolgálhatott volna még a kutatáshoz, a megalapozott következtetések levonásához szükséges merítés így is elegendőnek, sőt bőségesnek mutatkozik. A parttalanná válás, kezelhetetlenség csapdáját elkerülendő, a továbbiak e dolgozatból kimaradnak, s esetleg a szerző jövőbeli kutatásainak tárgyát képezik majd.

A dolgozatnak három fő kérdése van, amelyekre a következtetéseket tartalmazó, utolsó fejezet áttekinthető formában, kielégítő módon válaszol meg.

A szerző a témakörhöz kapcsolódó hazai és nemzetközi szakirodalmat feltárta; forrásai túlnyomórészt külföldiek. Megítélésem szerint kiválóan illeszkedik a nemzetközi szakmai diskurzusba. A joganyagoknak (legal sources) a dolgozat végén szereplő listája teljes mértékben lefedi a dolgozat első részében leírt problémafelvetéseket.

Minderre tekintettel bizalommal ajánlom a hazai szakmai közösség figyelmébe, s javaslom a nyilvános vitára bocsátását.

Debrecen, 2017. szeptember 12.

Fodor László
egyetemi tanár

NYILATKOZAT

Alulírott, dr. Bujdos Ágnes, büntetőjogi felelősségem tudatában kijelentem, hogy a Debreceni Egyetem Marton Géza Állam- és Jogtudományi Doktori Iskolában a doktori fokozat megszerzése céljából benyújtott, The Analysis of the Rules on Transboundary Water Pollution című értekezésem saját önálló munkám, a benne található, másoktól származó gondolatok és adatok eredeti lelőhelyét a hivatkozásokban (lábjegyzetekben), az irodalomjegyzékben, illetve a felhasznált források között hiánytalanul feltüntettem.

Kijelentem, hogy a benyújtott értekezéssel azonos tartalmú értekezést más egyetemen nem nyújtottam be tudományos fokozat megszerzése céljából.

Tudomásul veszem, hogy amennyiben részben vagy egészben sajátomként mutatom be más szellemi alkotását, vagy az értekezésben hamis, esetleg hamisított adatokat használok, és ezzel a doktori ügyben eljáró testületet vagy személyt megtévesztem vagy tévedésben tartom, a megítélt doktori fokozat visszavonható, a jogerős visszavonó határozatot az egyetem nyilvánosságra hozza.

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_____

aláírás

To Nóra and Papa

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List of abbreviations

AFS	International Convention on the Control of Harmful Anti-fouling Systems on Ships
BWM	International Convention for the Control and Management of Ships' Ballast Water and Sediments
CCS	Convention on the Continental Shelf
CFCLR	Convention on Fishing and Conservation of the Living Resources of the High Seas
CHS	Convention on the High Seas
CLRTAP	Convention on Long-range Transboundary Air Pollution.
CTS	Convention on the Territorial Sea and the Contiguous Zone
ECOSOC	United Nations Economic and Social Council
EU	European Union
GA	General Assembly
ICWE	International Conference on Water and the Environment
ICJ	International Court of Justice
ILA	International Law Association
IIL	Institute of International Law
ILC	International Law Commission
IMF	International Monetary Found
IMO	International Maritime Organization
ITLOS	International Tribunal for the Law of the Sea
LC	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter
OECD	Organisation for Economic Co-operation and Development
OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation
OPSD	Optional Protocol of Signature concerning the Compulsory Settlement of Disputes

OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	Third United Nations Convention on the Law of the Sea
UNCLOS I	Geneva Conventions on the Law of the Sea
UNCLOS II	Second United Nations Conference on the Law of the Sea
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
US	United States
WHO	World Health Organisation
WTO	World Trade Organisation

1. Introduction

Earth is called the 'Water Planet' as more than 70 per cent of its surface is covered with water, which practically means that water is by far the most common liquid on the Earth's surface.[1] Regarding the word 'water', it has to be mentioned that it is "a general term which may be applied to the waters of a river or the waters of a sea".[2] This classification can be also observed in the field of international law as it differentiates between maritime and non-maritime waters.[3] Nonetheless, both of them are of paramount importance. Starting with the freshwater also known as 'liquid gold',[4] it is a 'precious resource'[5] that is a precondition for life and it has no alternative.[6] In other words, as stated in the

[1] J. Boberg, *Liquid assets: How Demographic Changes and Water Management Policies Affect Freshwater Resources*, RAND Corporation, Santa Monica, CA, 2005, pp. 15-17; P. L. Brezonik & W. A. Arnold, *Water Chemistry: An Introduction to the Chemistry of Natural and Engineered Aquatic Systems*, Oxford University Press, Oxford, 2011, p. 10.

[2] A/CN.4/314, Replies of Governments to the Commission's questionnaire, *Extract from the Yearbook of the International Law Commission*, 1978, Vol. II(1), p. 256.

[3] J. Bruhács, *Nemzetközi Vízjog*, Akadémiai Kiadó, Budapest, 1986, p. 1.; See also: Institute of International Law's Resolution on the Utilisation of Non-maritime International Waters (Except for Navigation), adopted in Salzburg on 11 September 1961.; Institute of International Law's Resolution on The Pollution of Rivers and Lakes and International Law, adopted in Athens on 12 September 1979.

[4] F. Neill: 'The law around New Zealand's 'liquid gold'', *LawTalk*, Vol. 801, 2012, p. 6.

[5] Principle VIII of the European Water Charter. The text of the European Water Charter was adopted by the Consultative Assembly on 22 April 1967 (Recommendation 493 (1967)) and by the Committee of Ministers on 26 May 1967 (Resolution (67) 10). The European Water Charter was proclaimed in Strasbourg on 6 May 1968. Remark: We will often refer to the European Water Charter regarding freshwater. On the one hand, it can by justified by the fact that despite being a regional non-binding document, it contains numerous general ascertainments relating to freshwater. On the other hand, the European Water Charter was one of the sources of the Watercourses Convention and it was frequently referred in the preparatory documents. See e.g.; A/CN.4/274, Legal problems relating to the non-navigational uses of international watercourses. Supplementary report submitted by the Secretary-General pursuant to General Assembly resolution 2669 (XXV). (Vol.I and II), *Extract from the Yearbook of the International Law Commission*, 1974, Vol. I(2); A/CN.4/295, First report on the law of the non-navigational uses of international watercourses by Mr. Richard D. Kearney, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1976, Vol. II(1); A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, Extract from the Yearbook of the International Law Commission, 1982, Vol. II(1); A/CN.4/367 and Corr.1, First report on the law of the non-navigational uses of international watercourses, by Mr. J. Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*,1983, Vol. II(1); A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*,1988, Vol. II(1); A/CN.4/L.493 and Add.1 [and Add.1/Corr.1] and 2, The law of non-navigational uses of international watercourses. Draft articles and commentaries thereto adopted by the Drafting Committee on second reading: articles 1-33 reproduced in Yearbook…1994, vol. II (Part Two), para. 222, *Extract from the Yearbook of the International Law Commission*, 1994, Vol. II(2). Most importantly, the Commentary of the Watercourses Convention referes to the European Water Charter, namely the commentary relating to Art. 8 on General obligation to cooperate.

[6] A. K. De & A. K. De, *Environmental Engineering*, New Age International Ltd, New Delhi, 2009, pp. 66-67; L. Boisson de Chazournes, *Fresh Water in International Law*, Oxford University Press, Oxford, 2013, p. 12.

European Water Charter,[7] "There is no life without water. It is a treasure indispensable to all human activity".[8] Besides humans, plants and animals also depend on water as well as the whole ecosystem.[9] However, the degrading water quality of the World's water resources is triggering growing concerns, as it is interrelated with several serious problems such as human health, security and development, just to name a few examples.[12]

As such, not much of surprise that the United Nations (UN) has devoted specific attention to freshwater at universal level in the previous decades that can be illustrated, among others, with the International Drinking Water Supply and Sanitation Decade (1981-1990),[13] the International Conference on Water and the Environment (ICWE) in 1992[14] and the Earth Summit in 1992.[15] Furthermore, the General Assembly the year 2003 was declared to be the International Year of Freshwater,[16] and the 2005-2015 period was proclaimed the International Decade for Action, 'Water for Life'.[17]

Further, in the 1990s, two conventions were adopted in the realm of the United Nations , namely the Convention on the Protection and Use of Transboundary Watercourses and

[7] Resolution (67) 10, adopted by the Ministers' Deputies on 26th May 1967. See: A/CN.4/274, Legal problems relating to the non-navigational uses of international watercourses. Supplementary report submitted by the Secretary-General pursuant to General Assembly resolution 2669 (XXV). (Vol.I and II), *Extract from the Yearbook of the International Law Commission*,1974, Vol. 1(2), para. 373.; A/CN.4/295, First report on the law of the non-navigational uses of international watercourses by Mr. Richard D. Kearney, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1976, Vol. II(1), para. 41.

[8] Principle I of the European Water Charter..

[9] J. Verschuuren, Recht op water, *in* T. G. Drupsteen, H. J. M. Havekes & H. F. M. W. Van Rijswick (Eds.) *Weids water. Opstellen over waterrecht*, Sdu Uitgevers, Den Haag, 2006, p. 427.

[12] M. Palaniappan et al., Water Quality, *in* P.H. Gleick (Ed.), The World's Water Volume 7 The Beannal Report of Freshwater Resources, Island Press, Washington, Covelo, London, 2012, pp. 45-72.; . Boisson de Chazournes, 2013, pp. 109-111.

[13] 35/18. Proclamation of the International Drinking Water Supply and Sanitation Decade, adopted on 10 November 1980.

[14] International Conference on Water and the Environment took place in Dublin, Ireland, on 26-31 January 1992. Remark: We will refer to the ICWE when analysing the principle of sustainable development, more specifically The Dublin Statement on Water and Sustainable Development, adopted January 31, 1992 in Dublin, Ireland.

[15] United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992.

[16] A/RES/55/196.

[17] http://www.un.org/waterforlifedecade/

International Lakes (Water Convention)[18] and the Convention on the Law of the Non-Navigational Uses of International Watercourses (Watercourses Convention).[19]

Moving onto the sea water, as was the case with freshwater, seas are also protected by several conventions; however, these address specific topic relating to pollution[20] such as International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION),[21] International Convention for the Prevention of Pollution from Ships (MARPOL),[22] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LC),[23] International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC),[24] International Convention on the Control of Harmful Anti-fouling Systems on Ships (AFS)[25] and International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM).[26] Above all, we have to make a mention of the United Nations Convention on the Law of the Sea (UNCLOS)[27] also known as the "constitution of the ocean" that is a comprehensive set of rules concerning the sea.[28]

[18] Convention on the Protection and Use of Transboundary Watercourses and International Lakes, adopted on 17 March 1992 in Helsinki and entered into force on 6 October 1996. Remark: it will be discussed in detail in chapter 3.3 and 3.6.-3.8.

[19] Convention on the Law of the Non-Navigational Uses of International Watercourses, adopted on 21 May 1997 in New York and entered into force on 17 August 2014. Remark: it will be discussed in detail in chapter 3.1., 3.3-3.5.

[20] Remark: These conventions were established by the International Maritime Organisation (IMO), that is a United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships.

[21] International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), signed in Brussels on 29 November 1969 and entered into force 6 May l975. To date, the number of Contracting States is 89.

[22] International Convention for the Prevention of Pollution from Ships (MARPOL), signed in London on 2 November 1973, modified by the Protocol of 1978 relating thereto and by the Protocol of 1997, entered into force on 2 October 1983 It was developed by the International Maritime Organization. To date, it has 155 Contracting States. See, interestingly: E.L. Seres, A hajókról származó olajszennyezések problémái, Diáktudomány: A Miskolci Egyetem Tudományos Diákköri Munkáiból VII, 2014, pp. 135-139.

[23] LC, signed in London, Mexico City, Moscow and Washington on 29 December 1972 and entered into force 30 August 1975. (and the 1996 London Protocol). To date, the number of Contracting States is 87.

[24] OPRC, signed in London on 30 November 1990 and entered into force on 13 May 1995. To date, it has 112 Contracting States. In addition, Protocol on Preparedness, Response and Co-operation to pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol) signed in London on 15 March 2000 and entered into force on 14 June 2007.

[25] AFS, signed in London, on 5 October 2001 and entered into force on 17 September 2008. To date, it has 76 Contracting States.

[26] International Convention for the Control and Management of Ships' Ballast Water and Sediments adopted in London on 13 February 2004 and entered into force on 8 September 2017. to date, it has 65 Contracting States.

[27] UNCLOS signed in Montego Bay on 10 December 1982.

[28] Remark: UNCLOS will be discussed in detail in chapter 4.1-4.5.

After referring to some key legal sources regarding water under the auspices of the UN, water as a natural resource will be elaborated in the next chapter. However, before that analysis, we need to discuss a couple of important phrases regarding transboundary water pollution, followed by the research methodology, the research questions as well as the outline of this dissertation.

Starting with the term 'transboundary', first and foremost, it is crucial to refer to the different levels of water governance. It can be said that water governance can be discussed with respect to at least four levels, namely local, national, basin and global level. Each can be appropriate depending on the matter at hand.[29] Law has generally handled freshwater as a local or regional issue connected to a specific territory,[30] which is in harmony with the subsidiarity principle, according to which water issues should be solved at the lowest possible level. However, approaching water resources from national, regional or river basin perspectives is not always sufficient.[31] Several factors justify the global approach such as the recognition of the global nature of the hydrological cycle, the global environmental questions and their socio-economic effects, and that local issues may result in global phenomena.[32] Between national and global levels lies the important transboundary stratum, which is where international water governance has thus far mainly operated.[33] Interestingly, even in case of sea water "national, regional and global levels" are "essential to prevent and combat marine pollution".[34] However, as it follows from the word 'transboundary' only the basin or regional, and the global level are covered by this phrase. Moving onto the explanation of our terminology choice, namely 'transboundary', it is worth referring, on the one hand, to Hanqin's analysis concerning the terms 'transboundary', 'transnational', and 'international'. Although her examination approaches these terms regarding responsibility, it provides us with a valuable source. Starting with the term 'transboundary', she argues in the following way

[29] O. Ünver, 'Global Governance of Water: A Practitioner's Perspective', *Global Governance: A Review of Multilateralism and International Organizations*, Vol. 14, No. 4, 2008, p. 411.
[30] E. Brown Weiss, 'The Coming Water Crisis: A Common Concern of Humankind', *Transnational Environmental Law*, Vol. 1, No. 1, 2012, p. 153.
[31] A. Y. Hoekstra, *The relation between international trade and freshwater scarcity*, WTO Working Paper, January 2010, p. 4.; Ünver, 2008, p. 411.
[32] J. W. Dellapenna & J. Gupta, The Evolution of Global Water Law, *in* J.W. Dellapenna and J. Gupta (Eds.), *The Evolution of the Law and Politics of Water*, Springer, Doredrecht, 2009, p. 5.; A Blueprint to Safeguard Europe's Water *Resources* Brussels, 14.11.2012 COM(2012) p. 18.
[33] Ünver, 2008, p. 411.
[34] Preamble of the Convention for the Prevention of Marine Pollution from Land-Based Sources, signed in Paris, on 4 June 1974.

"With national boundaries in mind, the term "transboundary" stresses the element of boundary-crossing in term of the direct or immediate consequences of the act for which the source State is held responsible. It is the act of boundary-crossing which subjects the consequent damage to international remedy and initiates the application of international rules. Moreover, a "transboundary" harm may result from a transboundary movement across several boundaries that causes detrimental effects in several States. A transboundary act may also take the form of an act which causes harm in and beyond national jurisdiction or control, such as marine pollution of the high seas from land-based sources".[35]

Moreover, the term 'transnational' compared to the term 'transboundary' is rather used "to describe situations involving the transfer of technology". Further, under the word 'transnational' such kind of cases can be understood "*where the activity and the physical damage all occur within one country, but nonetheless there is a transnational involvement*". Finally, the term 'international' is applied for the cases involving those situations "where human activity carried on in one country produces damage on the territory of another country".[36]

On the other hand, the term 'transboundary' is adopted by several documents relating to water at universal level.[37] When it comes to freshwater, the said two universal Conventions in force must be mentioned. First, the Watercourses Convention that adopted the term 'international' as part of the phrase 'international watercourse,'[38] and the term 'transboundary' is merely used relating to 'transboundary harm.'[39] Second, the Water Convention was in favour of the term 'transboundary' and it is widely used throughout the whole text such as 'transboundary pollution,'[40] 'transboundary watercourses',

[35] X. Hanqin, *Transboundary Damage in International Law,* Cambridge University Press, Cambridge, 2003, p. 9. Interestingly, see: Prevention of Transboundary Harm from Hazardous Activities, adopted by the International Law Commission (ILC) in 2001, Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10).
[36] Hanqin, 2003, p. 9.
[37] Remark: In this paragraph we attempt no more than to have an idea relating to how widely and in what context the term 'transboundary' is used. That is why both binding and non-binding ducuments regulating water or environmental pollution at universal level.
[38] Art. 2(b) of the Watercourses Convention defines 'International watercourse' as "a watercourse, parts of which are situated in different States".
[39] Art. 32 of the Watercourses Convention.
[40] Preamble of the Water Convention.

'transboundary waters'[41] or 'transboundary impact'.[42] In addition, Berlin Rules adopted by the International Law Association (ILA) have to be mentioned concerning 'transboundary aquifers'[43] and 'transboundary harm.'[44] Finally, we have to make a mention of the Code of Conduct on Accidental Pollution of Transboundary Inland Waters[45] as well as the Draft articles on the Law of Transboundary Aquifers.[46] Moving onto sea water, , interestingly, the UNCLOS does not use the term 'transboundary'. Nonetheless, we can identify the word 'transboundary' in the Regional Seas Conventions such as in the OSPAR Convention as part of the term 'transboundary pollution'.[47] Additionally, regarding pollution we have to refer to the Principles Concerning Transfrontier Pollution [48] adopted by Organisation for Economic Co-operation and Development (OECD) as this document opted for a different terminology, namely transfrontier; however, as can be seen, on the one hand, the scope of this recommendation is not limited to water; on the other hand, as it follows from the references relating to the different sources that this term does not form part of the mainstream to describe "pollution emanating from one country with an effect in another".[49]

In addition, regarding the term 'transboundary', we have to make a mention of the shared natural resources. Nonetheless, it has to be emphasised that no reference concerning this concept can be found in the Watercourses Convention, in the Water Convention or in the UNCLOS. The reason behind shortly referring to it is, on the one hand, the fact that the

[41] Art. 1(1) of the Water Convention defines 'transboundary waters' as „any surface or ground waters which mark, cross or are located on boundaries between two or more States; wherever transboundary waters flow directly into the sea, these transboundary waters end at a straight line across their respective mouths between points on the low-water line of their banks".
[42] Art. 1(2) of the Water Convention determines 'transboundary impact' as „any significant adverse effect on the environment resulting from a change in the conditions of transboundary waters caused by a human activity, the physical origin of which is situated wholly or in part within an area under the jurisdiction of a Party, within an area under the jurisdiction of another Party. Such effects on the environment include effects on human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors; they also include effects on the cultural heritage or socio-economic conditions resulting from alterations to those factors".
[43] Art. 42 of the ILA's Berlin Rules. Remark: See chapter 1.1. relating to the role of the ILA in the adoption of the Watercourses Convention
[44] Art. 16 of the ILA's Berlin Rules.
[45] Code of Conduct on Accidental Pollution of Transboundary Inland Waters, adopted by the Economic Commission for Europe at its 45th session (1990) by decision C(45).
[46] Draft articles on the Law of Transboundary Aquifers, adopted by the International Law Commission at its sixtieth session in 2008.
[48] Recommendation of the Council on Principles concerning Transfrontier Pollution, C(74)224, 14 November 1974.
[48] Recommendation of the Council on Principles concerning Transfrontier Pollution, C(74)224, 14 November 1974.
[49] R.E. Stein, 'The OECD Guiding Principles on Transfrontier Pollution', *Georgia Journal of International and Comparative Law*, Vol. 6, 1976, pp. 245-258.

earlier drafts of the Watercourses Convention devoted a separate article to it, namely Article 7 on A shared natural resource. On the other hand, despite having no explicit reference to this concept, it can be suggested by adopting the said Conventions. As stipulated in Article 7, "System States shall treat the water of an international watercourse system as a shared natural resource". Relating to this concept the following statement can be found

"While the concept of shared resources may in some respects be as old as that of international co-operation, its articulation is relatively new and incomplete. It has not been accepted as such, nor in these terms, as a principle of international law, although the fact of shared natural resources has long been treated in State practice as giving rise to obligations to co-operate in the treatment of such resources. It is only during the last decade that the concept of shared natural resources has come to the fore".[50]

In addition, as indicated further,

"*If the concept of natural resources shared by two or more States has any core of meaning, it must be derived from the water of international watercourses. It was demonstrated in the first report of the Special Rapporteur that the physical facts of nature governing the behaviour of water that flows from the territory of one State to that of another give rise to inescapable interaction of that water. What happens to water in one part of an international watercourse generally affects, in large measure or small, sooner or later, what happens to water in other parts of that watercourse. A mass of scientific proof can be brought to bear to reinforce this incontestable truth".*[51]

In a later draft Article 5 states that *"Use of waters which constitute a shared natural resource" elicited numerous comments. Some representatives found even the concept "shared natural resource" controversial or without relevance to the topic; one did not object to the concept but felt that the meanings and the elements needed clarification; one expressed the view that "shared natural resource" was perhaps not the most appropriate term to use".*[52]

[50] A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*,1980, Vol. II(1), para. 143.

[51] Ibid. para. 141.

[52] A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*,1982, Vol. II(1), para. 27.

As discussed further, *"Apart from these criticisms and some feeling that the concept of shared natural resources was too new in international practice for the Commission to embrace it, the reception of article 5 was positive"*.[53]
However, as mentioned before, finally, it was not adopted.

Moving onto the term 'pollution', which forms part of the phrase 'water pollution', first, we have to invoke the term 'quality' that is "commonly used in relation to pollution, especially in such an expression as 'air quality' and 'water quality' and 'it refers generally to the essential nature and degree of purity of water,"[54] or in other words, "to the physical, chemical and biological characteristics of water". In conclusion, it can be summarized that polluted water has more 'negative qualities' than positive ones.[55] Moreover, it is worth referring to the relationship between the terms 'pollution' and 'contamination,' as some differentiate between them in the following way. The term 'contamination' is "*used for situations where a substance is present in the environment, but not causing any obvious harm, while pollution is reserved for cases where harmful effects are apparent*".[56]
Before we proceed onwards, our most important legal provisions regarding water pollution will be mentioned. First, Article 21 of the Watercourses Convention on Prevention, reduction and control of pollution, followed by two provisions of the UNCLOS such as Art. 1(4) of the UNCLOS relating to pollution of the marine environment and Article 194(1) of the UNCLOS on Measures to prevent, reduce and control pollution of the marine environment. We wish to take this opportunity to define these articles with the intention of having an idea regarding pollution before starting our analysis relating to water as a natural resource.
First, Article 21 of the Watercourses Convention on Prevention, reduction and control of pollution stipulates that
"1. For the purpose of this article, "pollution of an international watercourse" means any detrimental alteration in the composition or quality of the waters of an international watercourse which results directly or indirectly from human conduct.
2. Watercourse States shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution of an international watercourse that may cause significant harm to other watercourse States or to their environment, including harm to human health or

[53] Ibid. para. 28.
[54] Commentary of the Watercourses Convention, 1994, pp. 121-122.
[55] S.K. Agarwal, *Water Pollution*, A.P.H. Publishing Corp., New Delhi, 2005, p. 37.
[56] B.J. Alloway & D.C. Ayres, *Chemical Principles of Environmental Pollution*, 2nd ed, Blackie Academic & Professional, London, New York, 1997, p. 5.

safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse. Watercourse States shall take steps to harmonize their policies in this connection.

3. Watercourse States shall, at the request of any of them, consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of an international watercourse, such as:

(a) Setting joint water quality objectives and criteria;

(b) Establishing techniques and practices to address pollution from point and non-point sources;

(c) Establishing lists of substances the introduction of which into the waters of an international watercourse is to be prohibited, limited, investigated or monitored".

Second, Article 1(4) of the UNCLOS defines the 'pollution of the marine environment' as

"the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources[57] and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities".

Third, Article 194(1) of the UNCLOS on Measures to prevent, reduce and control pollution of the marine environment stipulates that

"States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection".

As this research aims to analyse water pollution, we cannot avoid drawing attention to the challenges to regulate water pollution. In introducing the difficulties regarding this question, the best is to make an excursion into Lammers' observations on the issue of defining water pollution. He pointed out that many sources had not even attempted to define water pollution, which may be due to two reasons. On the one hand, people generally have a 'fairly accurate idea' about water pollution; on the other hand, it is difficult to define it precisely, since the different approaches result in very divergent

[57] See: Art. 61 of the UNCLOS.

definitions "not only in details but sometimes in also fundamental respects". Indeed, it proves challenging to define what clean water is for several reasons. For one, nature itself does not provide 'pure' water, at the same time, there are variable considerations in play when deciding whether or not water is clean enough for human use, furthermore, water serves multiple purposes requiring different water quality, therefore the term 'clean water' may imply different water quality depending on the water uses in question. In addition, "even in the complete absence of pollution, the biological characteristics of different points within a river system vary widely according to the physical and chemical conditions prevailing at the different locations". Since the relationship between the 'biological community' and its 'physical environment' are not well understood, it may be hard to distinguish between natural and anthropogenic water pollution. This differentiation, however, is crucial from a legal point of view, as only the latter case has legal relevance.

Finally, we wish to justify why it is so utterly important to deal with transboundary water pollution. As stated in one of the preparatory documents of the Watercourses Convention, the "*basic physical consequences which result from fresh water being mobile, movable and the most universal of solvents, to list only three of its qualities that give rise to legal consequences*".[58] As can be seen, the legal consequence of the mobility as well as the solvent power of water are stressed. When it comes to the legal questions regarding water pollution,[59] first, we have to refer to those situations when an international river basin is not or not fully covered by a treaty regulating the river basin in question. In these situations, multilateral treaties can be adopted, however, these treaties are not applicable to those states who are not contracting parties. Alternatively, it is possible to sign bilateral agreements. Nonetheless, on the one hand, similarly to the adoption of international agreements in general, it is not possible to force a neighbouring country to sign a bilateral agreement. On the other hand, that agreement cannot regulate those incidents when the polluter is a third country. Consequently, the adoption of a definition regarding water pollution in a universal convention can influence the state practice and *vica versa* the state

[58] A/CN.4/295, First report on the law of the non-navigational uses of international watercourses by Mr. Richard D. Kearney, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1976, Vol. II(1), para. 26.; See also: "Water is never still". A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 13.

[59] Remark: Water pollution can be approached from other perspectives. See, e.g. D. Fisher-Ogden & S. Ross Saxer, 'World Religions and Clean Water Laws', *Duke Environmental Law & Policy Forum*, Vol. 17, 2006, pp. 63-117.

practice can fill out the term 'pollution', Second, the term 'pollution' is strongly related, among others, to the state responsibility and liability questions that are crucial when transboundary harm occurs as a result of water pollution.[60] Lastly, it cannot be overemphasised, on the one hand, as will be seen later, it took decades before adopting the Watercourses Convention in 1997 and its entry into force was equally lengthy as it finally entered into force in 2014. This latter one was especially disappointing if we consider that the Watercourses Convention required merely 35 instruments of ratification or accession to enter into force,[61] which is slightly less than one third of the states that voted in favour of the final draft. Because of it, we are convinced that it is advisable to exploit the opportunities provided by this definition as highly unlikely that a new convention would be negotiated and adopted in the near future, nonetheless, even the adoption of another convention could not be a guarantee for a better or a clearer definition. On the other hand, we have to reaffirm, that Article 21 of the Watercourses Convention was modelled on Article 1(4) and Article 194(1) of the UNCLOS and in sharp contrast to the Watercourses Convention, the UNCLOS has currently 168 Contracting Parties, so it

[60] On the state responsibility and liability relating to environmental questions, see: G. Kecskés, 'The Liability Issue and the Notion of Environmental Damage. A Starting Point of Definition', Studia Juridica et Politica Jaurinensis, Vol. 1, No. 1, 2014, pp. 19-26.; G. Kecskés, Az Európai Unió környezeti kárfelelősségi jogforrásai - csoportkép direktívákkal, *in* B. Fekete, B. Horváthy & B. Kreisz (Eds.), *A világ mi magunk vagyunk…: Liber Amicorum Imre Vörös*, HVG-ORAC, Budapest, 2014, pp. 263-273.; G. Kecskés, A környezeti károkért való felelősség a nemzetközi jogban, *in* G. Kecskés (Ed.), *Jubileumi kötet = Jubilee Volume: A SZE Állam- és Jogtudományi Doktori Iskolájának első 5 éve = First 5 Years of the Doctoral School of Law and Political Sciences Széchenyi István, University*, Széchenyi István Egyetem Állam- és Jogtudományi Doktori Iskola, Győr, 2013, pp. 84-85.; G. Kecskés, Liability for Environmental Damage within the Field of International Law *in* G. Kecskés (Ed.), *Jubileumi kötet = Jubilee Volume: A SZE Állam- és Jogtudományi Doktori Iskolájának első 5 éve = First 5 Years of the Doctoral School of Law and Political Sciences Széchenyi István University*, Széchenyi István Egyetem Állam- és Jogtudományi Doktori Iskola, Győr, 2013, pp. 86-87.; G. Kecskés, The Liability Issues of Environmental Cases in Central and Eastern Europe *in Social and Environmental Dimension of Sustainable Development: Alternative Models in Central and Eastern Europa*: *MyPhD 2012*., Friedrich Ebert Stiftung, Bratislava, 2013, pp. 106-121.; G. Kecskés, A felelősségi kérdések megjelenése a biodiverzitás témakörében, *in* A. Raisz (Ed.), *A nemzetközi környezetjog aktuális kihívásai*, Miskolci Egyetem, Miskolc, 2012, pp. 92-100.; G. Kecskés, *A környezeti károkért való felelősség a nemzetközi jogban*, Széchenyi István Egyetem, Győr, 2012, 360 p.; G. Kecskés, A mauritiusi dodó „szimbolikus" kihalása – felelősség és a biodiverzitás védelme a nemzetközi jogban, *in* Á. Boóc & B. Fekete (Eds.), *Il me semblait que j'étais moi-même ce dont parlait l'ouvrage: liber amicorum Endre Ferenczy*, Patrocinium Kiadó, Budapest, 2012, pp. 171-180.; G. Kecskés, 'Alapvetés az EU környezeti jogának elsődleges jogforrásokban megjelenő felelősségi irányairól', *Jogi Iránytű*, Vol. 3, No. 4, 2012, pp. 62-63.; G. Kecskés, The protection of the environment in the light of international liability regimes, *in* Ecological Movement of Novi Sad (Ed.), *Environmental Protection of Urban and Suburban Settlements.: Proceedings II*., Ecological Movement of Novi Sad, Novi Sad, 2011, pp. 171-176.; G. Kecskés, A környezeti kárfelelősség intézményesedésének egyes kérdései a nemzetközi jogban, *in* T. Nótári & G. Török (Eds.), *Prudentia iuris gentium potestate: Ünnepi tanulmányok Lamm Vanda tiszteletére*, MTA Jogtudományi Intézet, Budapest, 2010, pp. 239-251.; G. Kecskés, The concept of environmental damage in the framework of international law, *in* P. Smuk (Ed.) A jogállamiság 20 éve, Széchenyi István Egyetem, Győr, 2009, pp. 307-315.

[61] Art. 36 of the Watercourses Convention.

is a common interest to ensure that the definitions regarding water pollution do not drift apart.

Armed with this information, our time has come to determine the research methodology, followed by the research questions. Finally, the outline of the dissertation will be shared.

1.1. The research methodology and the research questions

This dissertation was prepared in the realm of the international environmental law, more specifically the international water law. Its most dominant research method is the legal dogmatic approach also referred to as 'analytical study of law' or 'doctrinal study of law'.[63] In addition, as an implication of the topic, this research is necessarily interdisciplinary. As such, among others, a whole chapter is devoted to water as a natural resource relying on the findings of the natural sciences.

After determining the research methods, our research questions have to be formulated.

The *first research question* wishes to find out the meaning of the 'pollution of the international watercourses' under Article 21(1) of the Watercourses Convention as well as the related obligations under Article 21(2), namely the obligation to prevent, reduce and control the pollution of the international watercourses. This research question is connected to the reasoning of the Commentary of the Watercourses Convention that states regarding Article 21(1) that "While it contains the basic elements found in other definitions of the term, paragraph 1 is more general in several respects".[64] As such, it is vital to explore how this general phrasing affects its meaning and what the meaning of the 'pollution of the international watercourses' is under Article 21(1) of the Watercourses Convention as well as the content of the obligation to prevent, reduce and control the pollution of the international watercourses.

The *second research question* is connected to the examination of the relationship between the Watercourses Convention and the Water Convention. This can be justified by the fact that a unique situation characterized by McCaffrey as "unprecedented in the annals of

[63] Legal Doctrine and Legal Theory *in* A. Peczenik et al. (Eds.), Treatise of legal philosophy and general jurisprudence. 4, Scientia juris: legal doctrine as knowledge of law and as a source of law, Springer, Dordrecht, 2007, pp. 1-2.

[64] Draft articles on the law of the non-navigational uses of international watercourses and commentaries thereto and resolution on transboundary confined groundwater, adopted by the International Law Commission at its forty-sixth session in 1994, *Yearbook of the International Law Commission*, 1994, Vol. II, Part Two, p. 121.

international law"[65] has emerged, namely two multilateral treaties covering the same subject matter, the Water Convention[66] and the Watercourses Convention[67] entered into force.[68] Moreover, the fact that only the Watercourses Convention provides a definition of water pollution, although both Conventions refer to this term, provides an opportunity to examine the relationship between the two documents.

The *third research question* is the meaning of 'pollution' under Article 1(4) of the UNCLOS as well as to examine the relationship between the term 'pollution' in Article 21 of the Watercourses Convention and in the UNCLOS. We find it inspiring to examine this relationship as Article 21 of the Watercourses Convention was modelled on the said Article of the UNCLOS.

To find the answers to these research questions, both primary and secondary sources formed part of this research. Regarding these sources it has to be laid down that the primary sources prevail over the secondary ones. This ascertainment can be explained by the fact that even though numerous scientific contributions have been devoted to water, those focused either on water in general or other topics relating to water in particular. Starting with the primary sources, first, the three universal Conventions have to be highlighted such as the Watercourses Convention, the Water Convention and the UNCLOS. Regarding these sources we have to make a mention of two things. First, since regarding freshwater pollution only the Watercourses Convention provides definition that goes without saying that the Water Convention part is disproportionately shorter. Second, as Article 21 of the Watercourses Convention was modelled on Article 1(4) and Article 194 of the UNCLOS, it is evident that the preceding freshwater part discusses several things that are also applicable to sea water; consequently, repetitions will be avoided. That is why while attempting to follow the same considerations and proportions in each part it is not always possible.

Second, we have to make a mention of the commentaries. First and foremost, the Commentary of the Watercourses Convention as well as the preparatory documents with

[65] S.C. McCaffrey, The 1997 UN Convention: Compatibility and Complementarity, *in* Tanzi *et al.* (Eds.), *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes: its contribution to international water cooperation*, Brill Nijhoff, Leiden, Boston, 2015, p. 51.

[66] Convention on the Protection and Use of Transboundary Watercourses and International Lakes, adopted on 17 March 1992 in Helsinki and entered into force on 6 October 1996.

[67] Convention on the Law of the Non-Navigational Uses of International Watercourses, adopted on 21 May 1997 in New York and entered into force on 17 August 2014.

[68] See; A. Tanzi, *The Economic Commission for Europe Water Convention and the United Nations Watercourses Convention An analysis of their harmonized contribution to international water law*, Water Series № 6, United Nations, New York, Geneva, 2015, p. 3.

their commentaries have to be mentioned. Regarding these sources of the Watercourses Convention we are pampered as all of them are easily accessible. However, in sharp contrast to the Watercourses Convention, the preparatory documents of the Water Convention are not accessible, so we have to content ourselves with some secondary sources as well as a relatively recent source regarding the interpretation of the Water Convention, namely the Guide to Implementing the Water Convention.[69] As such, besides having no definition that is the other reason why our research relating to this part is so limited. Nonetheless, we could rely on the other environmental conventions adopted under the auspices of the UNECE, as "Water Convention is an integral part of a wider legal framework in the UNECE region constituted by five environmental conventions".[70] The Convention is "both complemented by and contributes to the implementation of the other UNECE conventions. The Water Convention benefits from the work carried out under these instruments, since there is significant synergy in terms of their substantive scopes, obligations and commitments".[71] After a careful analysis of the UNECE environmental conventions, two of them deserve some remarks on water pollution, namely the 1979 Convention on Long-range Transboundary Air Pollution[72] and the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention).[73] Turning our attention to the UNCLOS, we have to observed that as was the case with the Watercourses Convention, the *travaux preparatoires* of the UNCLOS are considerable, nonetheless, these documents cannot support the exploration of the meaning of Article 1(4) and Article 194 of the UNCLOS. This can be explained at least partially by the fact that even though UNCLOS provides a definition regarding pollution, but it also defines special types of pollution covering practically all the polluting incidents. Consequently, in case of marine pollution those specialised definitions can be applied. Moreover, in default of case law regarding Article 21 of the Watercourses

[69] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013.
[70] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 5.
[71] Ibid.
[72] 1979 Convention on Long-range Transboundary Air Pollution, signed in Geneva on 13 November 1979 and entered into force on 16 March 1983. https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-1&chapter=27&lang=en
[73] Convention on Environmental Impact Assessment in a Transboundary Context, adopted in Espoo on 25 February 1991 and entered into force 10 September 1997.

Convention, the Water Convention as well as Article 1(4) and Article 194 of the UNCLOS, we have no chance to rely on the interpretation and the clarification of the distinguished judicial bodies.[74]

Third, we have to devote special attention to the activity of two non-governmental organisations, namely the International Law Association and the Institute of International Law. Before justifying their invaluable contribution to the adoption of the Watercourses Convention, we have to share some basic information regarding these organisations. Starting with the International Law Association,[75] it is a non-governmental organisation founded in Brussels in 1873,[76] but nowadays it locates in London. Based on its Constitution, its goal is *"the study, clarification and development of international law, both public and private, and the furtherance of international understanding and respect for international law"*.[77] The membership is open to everyone who is interested in international law and the members primarily join through regional branches,[78] which may represent either individual states or regional groups of countries.[79] ILA also establishes committees on selected areas of international law in order to conduct research and create reports, which are discussed by the members during the Biennial Conferences.[80] Although the committee members are not the representatives of their governments or any other organisations, it is needless to deny that some members try to protect the interests of their own governments.[81] ILA began its activity on freshwaters after the Second World War

[74] The International Court of Justice has missed several opportunities to deal with transboundary water pollution. See: Cases concerning the Gabčikovo-Nagymaros Project (*Hungary/Slovakia*), Judgment of 25 September 1997, Judgment, 1997 ICJ Rep. p. 7. and Pulp Mills on the River Uruguay (*Argentina v. Uruguay*), Judgment, I.C.J. Reports 2010, p. 14. Regarding the Pulp Mills case see: O. Bányai, 'Egy elszalasztott lehetőség: a hágai Nemzetközi Bíróság ítélete Nicaragua és Costa Rica környezetvédelmi vonatkozású jogvitájában', *Pro Futuro*, Vol. 5, No. 2, 2016, pp. 181-199. In addition, we cannot find relevant sources concerning the case law of the International Tribunal of the Law of the Sea (ITLOS). Interestingly, it is worth referring to some frequently cited cases relating to water and transboundary pollution such as Lake Lanoux Arbitration (France v. Spain), 12 R.I.A.A. 281; 24 I.L.R. 101, Arbitral Tribunal.1 November 16, 1957.; Case Relating to the Territorial Jurisdiction of the International Commission of the River Oder, (Series A No 23 -Series C No 17-11), Judgment of September 10th, 1929. and Trail SmelterArbitration (United States *v.* Canada), 16 April 1938 and 11 March 1941.

[75] The introduction of the International Law Association was based on Á. Bujdos, Water pollution and the rules of the International Law Association, in M. Szabó (Ed.) Doktoranduszok Fóruma, Miskolci Egyetem, Miskolc, 2014, pp. 63-68.

[76] http://www.ila-hq.org/en/about_us/index.cfm

[77] International Law Association, Constitution of the Association (adopted at the 76th Conference, 2014) 3.1.

[78] http://www.ila-hq.org/en/joining_the_ila/index.cfm

[79] http://www.ila-hq.org/en/branches/index.cfm

[80] http://www.ila-hq.org/en/committees/index.cfm

[81] C.B. Bourne, 'The International Law Association's Contribution to International Water Resources Law', *Natural Resources Journal*, Vol. 36, 1996, p. 158.

due to a number of serious concerns about international disputes on rivers such as the Indus, Nile or Columbia. In the background of these disputes stood the divergence of views of the upstream and downstream states on the use of water and it was predicted that the common view of law would contribute to the peaceful resolution of these debates. For the suggestion of Professor Eagleton, the ILA's Conference held at Edinburgh in 1954, established The Committee on The Use of the Waters of International Rivers (Rivers Committee), which was discharged in 1966, when the Helsinki Rules were adopted. Notwithstanding, a new committee named The Committee on International Water Resources was immediately established and it operated until 1986.[82] The most recent ILA committee on freshwater was the Water Resources Committee, which was active from 1990 until 2004. There is no current committee on freshwaters.[83] Moving onto the Institute of International Law (IIL), it is an "exclusively learned society, without any official nature" founded in 1873 at the Ghent Town Hall in Belgium and aims to contribute to the development of international law.[84] "*Eleven international lawyers of renown had decided to join together to create an institution independent of any governmental influence which would be able both to contribute to the development of international law and act so that it might be implemented"*.[85]

"Its purpose is to promote the progress of international law:

a) by striving to formulate the general principles of the subject, in such a way as to correspond to the legal conscience of the civilized world;

b) by lending its co-operation in any serious endeavour for the gradual and progressive codification of international law;

c) by seeking official endorsement of the principles recognized as in harmony with the needs of modern societies;

d) by contributing, within the limits of its competence, either to the maintenance of peace, or to the observance of the laws of war;

e) by studying the difficulties which may arise in the interpretation or application of the law, and where necessary issuing reasoned legal opinions in doubtful or controversial cases;

[82] Ibid. pp. 156-157.
[83] http://www.ila-hq.org/en/committees/index.cfm
[84] www.idi-iil.org/idiE/navig_statutes.html.
[85] http://www.idi-iil.org/en/histoire/

f) by affording its co-operation, through publications, public teaching and all other means, in ensuring that those principles of justice and humanity which should govern the mutual relations of peoples shall prevail".[86]

Regarding their sessions it has to be noted that they do not hold more than one session per year, however, the interval between two sessions cannot exceed two years.[87] When it comes to the membership, three categories of the members can be differentiated, namely Honorary Members, Members and Associates. The total number of Members and Associates under the age of 80 shall not exceed 132.[88] Associates are selected by the IIL from among those of various nations who have given service to international law either in the field of theory or in that of practice.[89] Those Associates who have participated effectively in three sessions becomes Members.[90] "The status of Honorary Member may be conferred on (…) any person who has distinguished himself in the field of international law".[91] Further, the IIL's Statute contains provisions relating to the proportion of the Members with the same nationality, namely "The nationals of a given State or confederation of States shall not, through any new election, obtain a proportion of places as Members exceeding one-fifth of the total number of Members existing immediately after such election".[92]

Their importance in the adoption of the Watercourses Convention can be illustrated, on the one hand, by

"During the discussion of the item in the Sixth Committee, the question arose whether the draft resolution to be recommended to the General Assembly should single out studies of a recent date undertaken by intergovernmental or non-governmental bodies. Some representatives were in favour of making a specific reference to the "Helsinki Rules on the Uses of the Waters of International Rivers" adopted by the International Law Association at its 52nd Conference held at Helsinki on 20 August 1966. 6 Others suggested that mention should likewise be made of the resolution entitled "Utilization of non-maritime international waters (except for navigation)" adopted at Salzburg, on 11 September 1961, by the Institute of International Law.7 Different views having been expressed on the question, it was finally decided to include the following passage in the

[86] Art. 1(2) of the Statutes of the Institute of International Law.
[87] Ibid. Art. 2.
[88] Ibid. Art. 3.
[89] Ibid. Art. 5(1).
[90] Ibid. Art. 4.
[91] Ibid. 7(1).
[92] Ibid. Art. 6(1).

report of the Sixth Committee to the General Assembly. It was agreed in the Sixth Committee that intergovernmental and non-governmental studies on the subject, especially those which are of a recent date, should be taken into account by the International Law Commission in its consideration of the topic".[93]

"The part of the supplementary report concerning studies made or being made by non-governmental organizations concerned with international law will include the available relevant work done by the Institute of International Law, the Inter-American Bar Association and the International Law Association".[94] *So, not only their rules and declarations were taken into account, but they played significant role in conducting research regarding the Watercourses Convention.*[95]

On the other hand, both the Commentary of the Watercourses Convention[96] and the preparatory documents refer to the outputs of the ILA and IIL.[97] Further, more

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[93] A/CN.4/244/Rev.1 General Assembly resolution 2669 (XXV) on progressive development and codification of the rules of international law relating to international watercourses - Note by the Secretariat, *Extract from the Yearbook of the International Law Commission*, 1971, Vol. II(2), para. 4.

[94] A/CN.4/270, Supplementary report on the legal problems relating to the non-navigational uses of international watercourses requested by the GA in res. 2669 (XXV), Advance report submitted by the Secretary-General pursuant to GA res.2926 (XVII), para. 11.

[95] A/CN.4/274, Legal problems relating to the non-navigational uses of international watercourses. Supplementary report submitted by the Secretary-General pursuant to General Assembly resolution 2669 (XXV). (Vol.I and II), *Extract from the Yearbook of the International Law Commission*, 1974, Vol. 1(2), para. 399-409.

[96] See: Regarding references to ILA: Commentary (22) to Art. 5, Commentary (5) to Article 10, Commentary (12) to Article 12; and footnotes 184, 222, 242, 304, 305, 313, 372, 390, 393, 400 and 401. Regarding references to IIL: Commentary (21) to Art. 5,, Commentary (5) to Art. 8,, Commentary (5) to Art. 24. and footnotes 184, 273, 371 and 372.

[97] A/CN.4/244/Rev.1, General Assembly resolution 2669 (XXV) on progressive development and codification of the rules of international law relating to international watercourses - Note by the Secretariat, *Extract from the Yearbook of the International Law Commission*, 1971, Vol. II(2); A/CN.4/270,Supplementary report on the legal problems relating to the non-navigational uses of international watercourses requested by the GA in res. 2669 (XXV), Advance report submitted by the Secretary-General pursuant to GA res.2926 (XVII), *Extract from the Yearbook of the International Law Commission*, 1973, Vol. II, A/CN.4/274, Legal problems relating to the non-navigational uses of international watercourses. Supplementary report submitted by the Secretary-General pursuant to General Assembly resolution 2669 (XXV), (Vol.I and II), *Extract from the Yearbook of the International Law Commission*, 1974, Vol. I(2); A/CN.4/283, Report of the Sub-Committee on the Law of Non-Navigational Uses of International Watercourses, *Extract from the Yearbook of the International Law Commission*, 1974, Vol. II(1), A/CN.4/294 and Add.1, Replies of Governments to the Commission's questionnaire, *Extract from the Yearbook of the International Law Commission*,1976, Vol. II(1), A/CN.4/295, First report on the law of the non-navigational uses of international watercourses by Mr. Richard D. Kearney, Special Rapporteur, Extract from the Yearbook of the International Law Commission, 1976, Vol. II(1), A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook*

importantly, not to mention the Preamble of the Watercourses Convention when referring to "*the valuable contribution of international organizations, both governmental and nongovernmental, to the codification and progressive development of international law in this field*".

After clarifying the significance of the ILA and the IIL in the field of water law, let's have a look at their most remarkable findings regarding freshwater pollution. Starting with IIL, its first relevant document was the Madrid Declaration issued in 1911 under the title International Regulations Regarding the Use of International Watercourses for Purposes Other than Navigation. In 1961, it was followed by the IIL Resolution on the Utilization of Non-Maritime International Waters (Except for Navigation), also known as the Salzburg Declaration as well as the resolution on The Pollution of Rivers and Lakes and International Law (Athens Resolution) in 1979. Moving on to the ILA, first and foremost, the Helsinki Rules on the Uses of the Waters of the International Rivers (1966) has to be mentioned, which constitutes a landmark in the evolution of international water law, especially the principle of equitable and reasonable utilization (which later also became the cornerstone of the Convention). Moreover, Montreal Rules on Pollution (1982) and Supplemental Rules on Pollution (1996) as well as the Berlin Rules on Water Resources Law (Berlin Rules) have to be referred to. Berlin Rules were adopted in 2004 and these are the most recent and most comprehensive addition to ILA's activity on water resources.

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of the International Law Commission,1980, Vol. II(1), A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), A/CN.4/352 and Add.1, Replies of Governments to the Commission's questionnaire, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), A/CN.4/367 and Corr.1, First report on the law of the non-navigational uses of international watercourses, by Mr. J. Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1983, Vol. II(1), A/CN.4/381 and Corr.1 and Corr.2 (French only), Second report on the law of the non-navigational uses of international watercourses, by Mr. Jens Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1984, Vol. II(1), A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), A/CN.4/421 & Corr.1-4 and Add.1 & 2, Fifth report on the law of the non-navigational uses of international watercourses by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1989, Vol. II(1), A/CN.4/462 and Corr.1 (Spanish only), Second report on the law of the non-navigational uses of international watercourses, by Mr. Robert Rosenstock, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1994, Vol. II(1), A/CN.4/L.493 and Add.1 [and Add.1/Corr.1] and 2, The law of non-navigational uses of international watercourses. Draft articles and commentaries thereto adopted by the Drafting Committee on second reading: articles 1-33 reproduced in Yearbook…1994, vol. II (Part Two), para. 222,, *Extract from the Yearbook of the International Law Commission*, 1994, Vol. II(2),

These rules were adopted after the Watercourses Convention and the Water Convention, and incorporate all the experience since the adoption of Helsinki Rules as well as the developments in the international environmental law.[98]

As can be conclude, we needed this lengthy introduction of these organisations as well as their activities concerning water to clarify and highlight their significant contribution to the adoption and interpretation of the Watercourses Convention including Article 21. As such, it will be possible to understand why we use their findings as important primary sources in analysing the Watercourses Convention.

Our final remark regarding the legal sources is connected to the use of multilateral and bilateral agreements. We wish to confirm that these sources were chosen after careful consideration with the aim to support the analysis of a certain terms or in default of any definition for a terminology to help us with the possible interpretations; however, other times they were simply used as an illustration.

Lastly, we wish to grab the opportunity to determine the place of this dissertation in the scientific literature. Starting with the international scientific literature, it has to be mentioned that several authors have dealt with the wider topic of water pollution in the last decades. That is not so surprising taking into account, on the one hand, the significance of this topic; on the other hand, that the dissertation attempts to analyse merely a niche of those legal rules governing water pollution and several questions relating to water do not form part of this research such as the examination of water pollution from certain sources, procedural rules concerning water pollution, the relationship between the principle not to cause harm and the equitable and reasonable utilisation, just to name a few.[99] If we narrow down the topic and wish to find those authors who were active in those fields that are the closest to this dissertation, first and foremost, J.G. Lammers[100] has to be mentioned who devoted a whole book to the analysis of transboundary water pollution, albeit he carried out his research decades ago, so all the

[98] See: Á. Bujdos, The UN Watercourses Convention, with special regard to the environmental provisions, *in* M. Szabó, R. Varga & P.L. Láncos (Eds.), *Hungarian Yearbook of International Law and European Law 2015*, Eleven Publishing, The Hague, 2016, pp. 152-153.

[99] C.B. Bourne, 'International Law and Pollution of International Rivers and Lakes', *The University of Toronto Law Journal,* Vol. 21, No. 2, 1971, pp. 193-202.; A.P. Lester, 'River Pollution in International Law, *American Journal of International Law,* Vol. 57, No. 4, 1963, pp. 828-853.

[100] See: J.G. Lammers, M.N. Boeve & R. Uylenburg, Potential effects from the non-entry into force of the UN Watercourses Convention, *in Kansen in het omgevingsrecht: opstellen aangeboden aan N.S.J. Koeman bij zijn afscheid van het Centrum voor Milieurecht*, 2010, pp. 217 – 225.; J.G. Lammers, The Gabcskovo-Nagymaros Case seen in particular from the perspective of the Law of International Watercourses and the Protection of the Environment, *Leiden Journal of International Law,* Vol. 11, 1998, pp. 287 - 320.

universal agreements in force forming part of our research are necessarily missing from his book.[101] We also have to refer to S.C. McCaffrey concerning his contributions relating to the Watercourses Convention. His counterpart relating to Water Convention is A. Tanzi.[102] Both of them endeavoured to examine the aforementioned conventions in a comprehensive way. Turning our attention to the Hungarian scholars, first and foremost, J. Bruhács[103] is worth mentioning for his contributions in the field of international water law in general; however, it cannot be skipped that he approached this field from public international law point of view and environmental aspects did not play role in his research. Moreover, J.E. Szilágyi[104] has to be referred to who was especially in a wide variety of

[101] J.G. Lammers, *Pollution of International Watercourses: search for substantive rules and principles of law*, Martinus Nijhoff, The Hague, 1984.

[102] A. Tanzi, O. McIntyre, A. Kolliopoulos; et al., The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes: its contribution to international water cooperation, Brill Nijhoff, Leiden, Boston, 2015.; A. Tanzi, Regional contributions to international water cooperation: the UNECE contribution, *in* L. Boisson de Chazournes, C. Leb & M. Tignino (Eds.), *International Law and Freshwater The Multiple Challenges*, Elgar, Cheltenham, 2013, pp. 155–178.; A. Tanzi & M. Arcari, *The United Nations Convention on the Law of International Watercourses*, Kluwer Law International, The Hague, 2001.; A. Tanzi, Non-navigational uses of international watercourses, protection and use of transboundary watercourses and international lakes: comparing 2 United Nations Conventions on Water, UN, Geneva, 2000.; A. Tanzi, 'Codifying the minimum standards of the law of international watercourses : remarks on part one and a half', Natural Resources Forum, Vol. 21, No. 2, 1997, pp. 109-126.

[103] J. Bruhács, 'Argentína és Uruguay vitája: a Nemzetközi Bíróság 2010. évi ítélete az Uruguay folyó menti papírgyár ügyben', *Jura*, Vol. 18, No. 2, 2012, pp. 40-50.; J. Bruhács, The international river law in the early 2000's, *in* P. Kovács (Ed.), *International Law - A Quiet Strength / Le droit international, une force tranquille / Miscellanea in memoriam Géza Herczegh*, Pázmány Péter Katolikus Egyetem, Jog- és Államtudományi Kar, Budapest, 2011, pp. 231-250.; J. Bruhács, 'A nemzetközi folyók jogáról szóló 1997. évi New York-i egyezmény', *Jura*, Vol. 6, No. 1-2, 2000, pp. 46-51.; J. Bruhács, *The law of international watercourses with special reference to the Danube catchment area*, JPTE Állam- és Jogtudományi Kar, Pécs, 1998.; J. Bruhács, *The law of non-navigational uses of international watercourses*, Akadémiai Kiadó, Martinus Nijhoff Publishers, Budapest; Dordrecht, 1993.; J. Bruhács, 'Evaluation of the legal aspects of project in international rivers', *European Water Pollution Control*, Vol. 3, 1992, pp. 10-14.; J. Bruhács, *Nemzetközi vízjog. A nemzetközi folyóvizek nem hajózási célú hasznosításának joga*, Akadémiai Kiadó, Budapest, 1986.; J. Bruhács, The problem of the definition of an international watercourse, *in* H. Bokorné Szegő (Ed.), *Questions of International Law 3. Hungarian Perpectives*, Akadémiai Kiadó, Martinus Nijhoff Publishers, Budapest, Leiden, 1986, pp. 69-84.

[104] J.E. Szilágyi, A mezőgazdasági vízjog, *in* Cs. Csák, Zs. Hornyák & B.E. Kocsis et al. (Eds.), *Agrárjog: A magyar agrár- és vidékfejlesztési jogi szabályozás lehetőségei a globalizálódó Európai Unióban*, Miskolci Egyetemi Kiadó, Miskolc, 2017, pp. 125-138.; J.E. Szilágyi, 'Current challenges concerning the law of water services in Hungary', *Lex et Scientia*, Vol, 23, No. 1, 2016, pp. 70-82.; J.E. Szilágyi, A víziközmű-szolgáltatások fő ágazatpolitikái, *in* T. Horváth M. & I. Bartha (Eds.) *Közszolgáltatások megszervezése és politikái. Merre tartanak?*, Dialóg Campus Kiadó, Budapest, 2016, pp. 43-52.; J.E. Szilágyi, 'A vízhez kötődő káresemények jogi szabályozása: Elötanulmány', *Publicationes Universitatis Miskolciensis Series Juridica et Politica*, Vol, 34, 2016, pp. 281-314.; J.E. Szilágyi, 'A mezőgazdasági öntözéssel összefüggő egyes jogi problémákról', *Miskolci Jogi Szemle: A Miskolci Egyetem Állam-és Jogtudományi Karának Folyóirata*, Vol, 10, No. 1, 2015, pp. 33-51.; J.E. Szilágyi, 'A vízágazat létfontosságú rendszereinek biztonságpolitikai védelme és a magyar vízjog', *Publicationes Universitatis Miskolciensis Series Juridica et Politica*,Vol, 33, 2015, pp. 354-366.; J.E. Szilágyi, Az uniós Víz-keretirányelv költségmegtérülésének elve az Európai Bíróság esetjogának tükrében, in J. Szalma (Ed.), A Magyar Tudomány Napja a Délvidéken 2014, Vajdasági Magyar Tudományos Társaság, Újvidék, 2015, pp. 212-226.; J.E. Szilágyi, 'A vízjogi szabályozási csomópontok továbbfejlesztésének lehetőségei', *Pro Futuro – A Jövő Nemzedékek Joga*, Vol. 5, No. 2, 2015, pp. 38-54.; A. Csibi & J.E. Szilágyi, 'A költségmegtérülés elvének érvényesülése a vízszolgáltatások körében', *Publicationes Universitatis*

topics relating to water in the previous years and published a book relating to water, which provides a comprehensive review of water-related legal questions; however, water quality issues do not form part of his research in that sense it will be covered by this dissertation. In addition, we have to make a mention of A. Raisz[105] primarily for her publications relating to groundwater and aquifers, though other water-related topics were also examined by her.

Before we proceed onwards, the upcoming chapters will be shortly introduced.

After the Introduction including the research methodology and the research question, in the second chapter we will endeavour to introduce water as a natural resource. Our firm belief is that without a sound understanding of water as a natural resource it is not possible to correctly analyse the legal provisions relating to it. That is why, first, we will describe the allocation of water on Earth and thereby we will draw attention to the limited availability of freshwater followed by the introduction of water cycle, the characteristics of water as well as its self-purification capacity. Then, the relationship between water uses and water pollution will be explained supplemented by the classification of water pollution and water pollutants. Then, the principle of sustainable development will be

*Miskolciensis Series Juridica et Politica,*Vol, 32, 2014, pp. 371-396.; J.E. Szilágyi, 'A magyar víziközmű-szolgáltatók integrációja jogi nézőpontból', *Pro Futuro – A Jövő Nemzedékek Joga*, Vol. 4, No. 1, 2014, pp. 144-162.; J.E. Szilágyi, 'A magyar víziközmű-szolgáltatások és a Víz-keretirányelv költségmegtérülésének elve', *Miskolci Jogi Szemle: A Miskolci Egyetem Állam-és Jogtudományi Karának Folyóirata*, Vol. 9, No. 1, 2014, pp. 73-94.; J.E. Szilágyi, *Vízjog: Aktuális kihívások a vizek jogi szabályozásában*, Miskolci Egyetem, Miskolc, 2013.; J.E. Szilágyi, 'Az átfogó vízjogi szabályozás kérdései', *Magyar Jog*, Vol. 60, No. 2, 2013, pp. 75-86.; J.E. Szilágyi, Affordability of Drinking-water and the New Hungarian Regulation Concerning Water Utility Supplies, in V. Greksza Veronika & M. Szabó (Eds.), *Right to Water and the Protection of Fundamental Rights in Hungary*, University of Pécs, Pécs, 2013., pp. 68-83.; J.E. Szilágyi, 'Az EU és Magyarország vízstratégiája: Elemzés a jogi szabályozás és a magyar kihívások tükrében', *Publicationes Universitatis Miskolciensis Series Juridica et Politica,*Vol,31, 2013, pp. 475-497.

[105] A. Raisz & E.L. Seres, When Environmental Protection Meets Human Rights: In the Wake of the Prestige, *in* M. Szabó, R. Varga & P.L. Láncos (Eds.), *Hungarian Yearbook of International Law and European Law 2015*, Eleven International Publishing, Hague, 2016, pp. 139-149.; A. Raisz & E.L. Seres,'Környezetvédelem és emberi jogok találkozása: a Prestige-katasztrófa utóhullámai', *Publicationes Universitatis Miskolcienis Series Juridica et Politica*, Vol. 32, 2014, pp. *189-198.*; A. Raisz, Water as the Nation's Common Heritage in the Frame of the Common Heritage of Mankind, *in* V. Greksza & M. Szabó (Eds.), *Right to Water and the Protection of Fundamental Rights in Hungary*, University of Pécs, Pécs, 2013, pp. 84-96.; A. Raisz, 'A felszín alatti vizek határon átnyúló szennyezésére vonatkozó nemzetközi szabályozás', *Publicationes Universitatis Miskolcienis Series Juridica et Politica,* Vol. 30, No. 2, 2012, pp. 371-382.; A. Raisz, A vízhez való jog egyes aktuális kérdéseiről, *in* Cs. Csák (Ed.), *Jogtudományi tanulmányok a fenntartható természeti erőforrások témakörében*, Miskolci Egyetem, Miskolc, 2012, pp. 151-159.; A. Raisz, Magyarország felszín alatti vizei a nemzetközi jog újabb megközelítésében: Kincs, ami nincs?, *in* A. Raisz (Ed.) *A nemzetközi környezetjog aktuális kihívásai*, Miskolci Egyetem, Miskolc, 2012, pp. 149-160.; Cs. Csák & A. Raisz, Trinkwasserskandal in der drittgrößten Stadt Ungarns: Theorie und Praxis der Haftung im ungarischen Umweltrecht in Jahrbuch des Agrarrechts VIII, 2008, pp. 165-176.

examined with special regards to its three pillars and the last part of this chapter will focus on the sovereignty questions relating to rivers as well as the river as a boundary line.

The third chapter is devoted to freshwater. As such, the Watercourses Convention and the Water Convention will be analysed in detail. In the beginning we will put the emphasis on general, but unavoidable topics such as the adoption of the two Conventions or the establishment of the UNECE. This will bring us to compare the two Conventions based on certain characteristics such as their framework character, their geographical scope, not to mention the traditional differentiation between the 'economic cast' of the Watercourses Convention compared to the environmental approach of the Water Convention. Then, we will start our examination with the Watercourses Convention, followed by the Water Convention. Regarding the two Conventions we attempt to examine them in line with similar considerations. When it comes to the Watercourses Convention, we will start with Article 20 on Protection and preservation of the ecosystem, followed by Article 21 on Prevention, reduction and control of pollution. First, Article 21(1) regarding the 'pollution of the international watercourse' will be analysed. Then, we will examine Article 21(2) relating to the obligations to prevent, reduce and control the pollution of an international watercourse. Moving onto the Water Convention, on the one hand, we have identified that we do not have the primary resources, namely the preparatory documents. On the other hand, the Water Convention does not define the term pollution. These circumstances affect both the length and the deepness of our research. Consequently, first, the provisions relating to the ecosystem will be discussed, followed by the concept of 'transboundary impact'. Then, we wish to collect all the references relating to water pollution as well as to the obligations to prevent, reduce and control in the Water Convention. Finally, the relationship between the Water Convention and the other UNECE environmental conventions will be explained.

The fourth chapter focuses on the pollution of the marine environment. First, the adoption of the UNCLOS will be shortly discussed, followed by the analysis of Article 192 of the UNCLOS on Protection and preservation of the Marine Environment and the examination of the same obligations in the Regional Seas Conventions. Second, the definition of the marine environment was analysed as well as Article 1(4) of the UNCLOS relating to the pollution of the marine environment. Then, Article 194(1) on Measures to prevent, reduce and control pollution of the marine environment. Finally, we will explore the intersection between the pollution of the international watercourses and the pollution of the marine

environment. As such, the land-based marine pollution via watercourses will be examined.

2. Water as a natural resource

First, we will describe the allocation of water on Earth and thereby we will draw attention to the limited availability of freshwater followed by the introduction of water cycle, the characteristics of water as well as its self-purification capacity. Then, the relationship between water uses and water pollution will be explained supplemented by the classification of water pollution and water pollutants. Then, the principle of sustainable development will be examined with special regards to its three pillars and the last part of this chapter will focus on the sovereignty questions relating to rivers as well as the river as a boundary line.

2.1. The allocation of water on Earth

Although the Earth is called the 'Water Planet' as more than 70 per cent of its surface is covered with water, which practically means that water is by far the most common liquid on the Earth's surface,[109] 97 per cent of this water can be found in the ocean, so the vast majority of water on Earth is unfit for human consumption or other uses due to its high salt content. In addition, two thirds of the remaining freshwaters are locked up in glaciers and permanent snow cover, so no more than 0.7 per cent is available as freshwater[110] (0.66 per cent of which is groundwater[111] and just 0.03 per cent is available as surface water[112] in rivers,[113] lakes[114] and streams).[115] Besides this limited availability, water is unevenly distributed across the globe.[116] Some countries such as Canada or Austria are rich in water, while others like Australia or China belong to water stressed areas.[117] In

[109] Boberg, 2005, pp. 15-17; P. L. Brezonik & W. A. Arnold, *Water Chemistry: An Introduction to the Chemistry of Natural and Engineered Aquatic Systems*, Oxford University Press, Oxford, 2011, p. 10.

[110] Art. 2(b) of the Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources states that 'freshwater` means „naturally occurring water having a low concentration of salts, which is often acceptable as suitable for abstraction and treatment to produce drinking water".

[111] Art. 2(2) of the Directive 2000/60/EC states that 'groundwater' means "all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil".

[112] Art. 2(1) of the Directive 2000/60/EC defines 'surface water' as "inland waters, except groundwater; transitional waters and coastal waters, except in respect of chemical status for which it shall also include territorial waters". In addition, Art. 2(3) of Directive 2000/60/EC states that 'inland water' means "all standing or flowing water on the surface of the land, and all groundwater on the landward side of the baseline from which the breadth of territorial waters is measured".

[113] Art. 2(4) of the Directive 2000/60/EC stipulates that 'river' means a "body of inland water flowing for the most part on the surface of the land but which may flow underground for part of its course".

[114] Art. 2(5) of the Directive 2000/60/EC states that 'lake' means a "body of standing inland surface water".

[115] De & De, 2009, p. 66-67. Interestingly, see further: E. Brown Weiss, *International Law for a Water-Scarce World*, Martinus Nijhoff Publishers, Leiden, Boston, 2013.

[116] Rieu-Clarke & Rocha Loures, 2013, p. 3.

[117] G. Kardos, 'A vízhez való jog', *Acta Humana*, Vol. 15, No. 1, 2004, p. 95.

addition, climate change affects the environment especially through water[118] and it is predicted to contribute to the reduction of renewable surface and groundwater as well as change in stream flow and water quality.[119] Furthermore, it can increase the frequency of extreme weather events such as droughts and floods.[120] Precipitation as well as evaporation can be identified as the main climatic drivers influencing freshwater resources. [121] In other words, "*global warming threatens to disrupt traditional rainfall and runoff patterns and could increase the frequency and severity of both drought and floods*".[122]

Moreover, the demand for freshwater is continuously increasing in spite of its limited availability. Consequently, beyond genuine water scarcity, which is attributable to climate or drought, human induced factors are also responsible for the growing demand for freshwater[123] that often results in overexploitation[124] due to population growth, urbanisation and economic development.[125] The Falkenmark Water Stress Index is one of the earliest assessments and it measures water availability as a function of population. It differentiates between "genuine" and "human-induced" water.[126] In the first case, we talk about the lack of water due to climate or drought, whereas, in the second case, the water scarcity is the result of the reduction in water availability due to poor management or overpopulation.

"*Based on this definition, "degrees of scarcity" ranging from "limited water stress" (>1,700 m3 /person/year) to "absolute water scarcity" (<500 m 3 /person/year) were developed based on a per capita minimum of 100 liters per day".*

[118] Boisson de Chazournes, 2013, p. 112.; N.W. Arnell, 'Climate change and global water resources', Global Environmental Change, Vol. 9, 1999, p. 31.
[119] J. Cisneros et al., 2014: Freshwater resources *in Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, 2014, pp. 2-3.
[120] P. Sands & J. Peel, *Principles of International Law*, 3rd ed, Cambridge University Press, Cambridge, 2012, p. 304.
[121] Cisneros, 2014, pp. 10-11.; Arnell, 1999, p. 31. See also: J. Quiggin, 'Uncertainty and Climate Change Policy', *B.E. Journal of Economic Analysis & Policy*, Vol. 30, No. 2, 2008, pp. 203-210.
[122] See also: P.H. Gleick & J. Morrison, Water Risks that Face Business and Industry *in* P. H. Gleick, L. Allen et al., *The World's Water Volume 7: The Biennial Report on Freshwater Resources*, Island Press, Washington, 2012, p. 152.
[123] J.C. Padowski & J.W. Jawitz, 'The Future of Global Water Scarcity: Policy and Management Challenges and Opportunities', *Whitehead Journal of Diplomacy and International Relations*, Vol. 10. No. 2, 2009, p. 100.
[124] Kardos, 2004, p. 95; Rieu-Clarke & Rocha Loures, 2013, p. 3.
[125] www.eea.europa.eu/articles/water-in-the-city.
[126] "Water in the city" < www.eea.europa.eu>

Additionally,, the International Water Management Institute's Water Scarcity Index draw a distinction between "physical water scarcity" and "economic water scarcity." While, in the first case, there are not sufficient water resources to meet agricultural, domestic, industrial and environmental needs; in the second case, there are sufficient water resources, but the access to them requires additional financial and infrastructural development.[127]

Based on the data published by the Food and Agricultural Organisation, water scarcity already affects every continent and more than 40 per cent of the Earth's population. According to the current predictions, by 2025, almost 2 billion people are going to live in countries with absolute water scarcity, and two-thirds of the world's population may live under water stressed conditions.[128]

Interestingly, many regions in the world face both water scarcity and flooding. Scarcity normally occurs during the dry season, while flooding is typical during the wet period of the year.[129] The severe and frequent weather events can cause devastating floods and other water-related calamities.[130]

Not to mention, wasting water can also contribute to the scarcity, as approximately half of the piped waters flow away due to leakages. In the developing countries 70 to 90 per cent of water stocks are used for irrigation in the agriculture, whereas in the developed countries water is overused in the industrial and energy sector.[131] Armed with this information, it came as no surprise that some argue that

"The water crisis is not the crisis of the water availability. It is a crisis of the mismanagement of the resource and the inadequacy of the institutions and governance structures that can ensure that every drop of water is used wisely to cover human needs and increase environmental sustainability. There is sufficient water for human needs. The problem is how to share water in an equitable manner to ensure both the service of human needs and the sustainability of natural ecosystem".[132]

Whether or not we accept this argumentation, it cannot be overemphasised that water is a renewable natural resource; however, its renewable capacity is not unlimited. In other

[127] Padowski & Jawitz, 2009, p. 100.
[128] http://www.fao.org/Newsroom/en/focus/2007/1000521/index.html
[129] Hoekstra, 2010, p. 5.
[130] Brown Weiss, 2012, p. 153.
[131] Kardos, 2004, p. 95.; Arnell, 1999, p. 33.
[132] E. Louka, Water law & policy: governance without frontiers, Oxford University Press, Oxford, New York, 2008, pp. 10-11.

words, unlike sea water, freshwater resources are not inexhaustible,[133] so it is "essential to conserve, control, and wherever possible, to increase them".[134]

When it comes to the world's freshwaters, these constitute 276 international river basins in the world shared by 145 countries covering approximately half of the Earth's land surface and 40 per cent of the world population.[135] Consequently, there is hardly any country in the world that would not be affected by waters from other countries belonging to the same river basin in terms of water quantity as well as quality, especially by neighbouring countries. To illustrate this interdependence, Hungary provides an excellent example. Hungary's entire territory belongs to the Danube River Basin shared by 19 countries, which makes it the world's most international river basin extending beyond the borders of the EU.[136] Thanks to its location 95 per cent of Hungary's waters originate beyond the borders and approximately 90 per cent of this water leaves Hungary at the southern part of the country.[137] Consequently, apart from some island states, the vast majority of the states are involved in transboundary water issues this or that way. Nonetheless, contrary to our expectations, being an island state does not guarantee that they would be free from challenges concerning water. In terms of difficulties relating to water quantity, Australia can be mentioned as a well-known example of water-scarce countries.[138] Moreover, even New Zealand is facing challenges relating to freshwater,

[133] Principle I of the Dublin Statement on Water and Sustainable Development that states "Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment". See also: Principle II of the European Water Charter.
[134] Principle II of the European Water Charter.
[135] A. Rieu-Clarke & F. Rocha Loures, Introduction, *in* F. Rocha Loures & A. Rieu-Clarke (Eds.), *The UN Watercourses in Force: Strengthening international law for transboundary water management*, Routledge, New York, 2013, p. 5. Interestingly, it is worth noting concerning the river system that "All river systems appear to have basically the same type of organization. The river system is dynamic in that it has portions that move and can cause events and create changes. There is not only unity displayed by important similarities between rivers in different settings, but also an amazing organization of river systems. This in part results from a delicate balance between the forces of erosion and the forces of resistance. The manner in which a channel moves across the valley floor, eroding one bank and building a nearly flat flood plane on the other, all the while maintaining a cross section similar in shape and size, is another aspect of the dynamic equilibrium that appears to characterize many channel systems". See: W.C. Walton, *The World of Water*, Weidenfeld and Nicolson, London, 1970, pp. 212-213 See from: A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1980, Vol. II(1), para. 57.
[136] http://www.icpdr.org/main/danube-basin/countries-danube-river-basin
[137] J. Bruhács, *Nemzetközi Jog II. Különös rész*, Dialóg Campus, Budapest, Pécs, 2010, p. 85.
[138] M.E. Qureshia, M.A. Hanjra & J. Wardf, ' Impact of water scarcity in Australia on global food security in an era of climate change', *Food Policy*, Vol. 38, 2013, pp. 136–145.; C. Chartres & J. Williams, 'Can Australia Overcome its Water Scarcity Problems?', *Journal of Developments in Sustainable Agriculture*, Vol. 1, No. 1, 2006, pp. 17-24.

though obviously not in transboundary context.[139] It is especially surprising in light of the abundancy of New Zealand's freshwater resources. To top it all, these resources vary from glaciers and seepages in the mountains to rivers and streams, which finally enter into sea.[140] However, unfortunately, freshwater does not always locate where New Zealander's require it, consequently, water shortages can occur in some areas at certain times of the year. When it comes to water quality, by international standards, freshwater can be deemed to be clean in New Zealand, albeit because of the growing demand, the population growth and the land intensification, water quality in New Zealand varies significantly[141] and it has been decreasing in some urban and rural areas.[142] The three most common types of pollutants causing problems in New Zealand's waters are pathogens, sediments and nutrients.[143]

After this quick side note on Australia and New Zealand regarding the national freshwater challenges, it is time to return to the river basins. As illustrated concerning river basins

"*The interaction of drainage, geology, soils, climate, and vegetation within a particular river basin produces an individual relationship between these physical elements different from that in another river basin or another natural unit, but topography, geology, soils, climate, and vegetation do not per se, either separately or together, distinguish the river basin in general as a type of land area"*.[144]

If we concentrate on international watercourses, 'immense diversity' of these river systems can be observed. In terms of size we can see that *"they range from such enormous systems as the Congo, the Amazon, the Mississippi and the Ganges, all of which drain more than 1 million square kilometres, to the smallest of streams".*

In addition, regarding the water quantity of these watercourses it can be concluded that numerous watercourses are located in arid parts of the Earth, so "they flow on the surface only intermittently, and disappear in the dry season", whereas other areas are affected by

[139] *New Start for Fresh Water*, Office of the Minister for the Environment, Office of the Minister of Agriculture Cabinet, 8 June 2009.; *Freshwater reform 2013 and beyond*, Ministry for the Environment, March 2013.; E. Hudspith, 'Freshwater Management in New Zealand: a Challenge for Ecology, Equity, and Economic Efficiency', *New Zealand Journal of Environmental Law*, Vol. 16, 2012, pp. 277-317.
[140] http://www.doc.govt.nz/nature/habitats/freshwater/
[141] Ministry for the Environment NZ, 2013.
[142] Ministry for the Environment NZ, 2013.
[143] *Water quality in New Zealand Understanding the science*, Parliamentary Commissioner for the Environment, March 2012, p. 39.
[144] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 40.

the water surplus resulting in floods.[145] Moreover, it is needless to say that regardless of the location of the watercourses "the quantity of water in a watercourse reflects seasonal variations in flow.[146]

The factors having influence on the water quantity that reaches the watercourse system can be classified into three categories such as meteorological, catchment and human factors.[147] Embarking upon the meteorological factors, firs, it has to be pointed out that these factors "*determine the maximum amount of runoff for any given catchment area at any given time. The rate of evapotranspiration is a function of "solar radiation, temperature, humidity, windspeed and barometric pressure*". Moreover, "The release of precipitation (…) varies according to the type of moisture".[148] Moving onto the catchment factors, it has to be noted that several variables can be considered to belong to these factors, among others the "slope of the catchment area has an impact upon the speed with which water travels and hence upon its percolation through the soil", furthermore, "rock and soil type, as well as vegetative cover and the drainage network, are additional catchment features".[149] Al last, it has to be noted that the available freshwater highly depends on human factors. As indicated in the European Water Charter in the 1960s,
"The population explosion and the rapidly expanding needs of modern industry and agriculture are making increasing demands on water resources. It will be impossible to meet these demands and to achieve rising standards of living, unless each one of us regards water as a precious commodity to be preserved and used wisely".[150]

2.2. The water cycle

The total amount of water on Earth is constant (about 1.4 billion km^3 [151]); therefore, it is merely the physical state of the water that is changing continuously between the three phases, namely ice, liquid and water vapour.[152] In other words,
"*On a world basis, water leaving the land mass of the earth returns in an equal amount. This process goes on in an unbroken pattern. Variations in the patterns of departure and*

[145] Ibid., para. 63.
[146] Ibid., para. 28.
[147] Ibid., para. 24.
[148] Ibid., para. 25.
[149] Ibid., para. 26.
[150] Principle XI of the European Water Charter. Remark: This statement has been reaffirmed by numerous binding and non-binding documents at universal, regional and national level.
[151] http://www.unwater.org/statistics/statistics-detail/en/c/211801/
[152] Boberg, 2005, pp. 15-17.

return occur continuously and universally, but as far as water is concerned whatever goes up comes down".[153]

The **"***Average residence times for the different phases of the hydrological cycle vary from a few days, for the atmospheric phase, to sometimes more than hundreds of years for groundwater*".[154] Interestingly, concerning water in the atmosphere, it is worth noting that "the cycle operates at a fairly rapid pace: once every 12 days practically all the water in the air falls and is replaced".[155] That is why merely a small amount of water of the world's water resources can be found in the atmosphere at any time.[156] However, "water molecule spends an average length of time of 40 000 years in the ocean before it is evaporated and recycled".[157] In order to illustrate the process taking place in the atmosphere, we can say that approximately 1200 km^3 water evaporates from the oceans every single day and about 190 km^3 water leaves the terrestrial surface due to the evapotranspiration. When it comes to water reaching the sea and the land in the form of rain and other precipitation, it has to be noted that about 1000 km^3 falls on the sea and 300 km^3 falls over the land this way. In addition, approximately 110 km^3 water return to the sea via rivers, groundwater and meltwater.[158] The total flow of water to the oceans via streams can be best illustrated if we say that 10 litres of river water are added every square centimetre of ocean surface every thousand years.[159] Alternatively, this process can be described in the following way: *"Water falls to the earth in various forms of precipitation, with four results: (1) some water will be intercepted by vegetation and will never reach the ground; (2) some will remain on the earth's surface, dampening the soil or forming pools; (3) a proportion will seep directly into the soil; (4) the balance will form streams and begin to flow to lower ground"*.[160]

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[153] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 10.

[154] P.P. Calow, *The Blackwell's Concise Encyclopedia of Ecology*, Wiley-Blackwell Published, Estados Unidos, 1999, p. 148.

[155] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 10.

[156] Calow, 1999, p. 148.

[157] N. Rajvaidya & D.K Markandey, *Water: Characteristics and Properties,* A.P.H. Pub. Corp., New Delhi, 2005, p. 9.

[158] Calow, 1999, p. 148.

[159] Rajvaidya & Markandey, 2005, p. 9.

[160] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 12. See also: Principle I of the European Water Charter states that „Water falls from the atmosphere to the earth mainly in the form of rain and snow.

After explaining the water cycle, we have to make it clear, while the total amount of water on Earth remains constant, the amount of water available within a river or a river basin 'can and does vary' within broad limits thanks to climatic and man-made factors.[161] Concerning river basins, this can be connected to the phrase 'water balance' that is described in the Danube River Protection Convention, as

"*the relationship characterising the natural water household of an entire river basin as to its components (precipitation, evaporation, surface and underground run-off). In addition a component of current man-made effects originating from water use and influencing water quantity is included"*.[162]

Further, it has to be mentioned that the movement of water through a watercourse is merely one phase of the hydrologic cycle. As indicated in the European Water Charter, *"Surface waters flow away down the steepest slopes, converging to form water-courses. A river and its tributaries are like a many-branched tree, and they serve an area known as a watershed or drainage basin"*.[163]

"The role of the watercourse in the cycle is the channelling of surface water and some groundwater to the sea. Considered together, surface water and groundwater are called "runoff". Surface flow, however, consists of three parts: channel precipitation, overland flow and interflow".[164]

Starting with the 'channel precipitation', it can be said that it is *"the fall of rain, etc., directly upon watercourses. Normally, it is a very small proportion of total runoff because of the limited catchment area".* Moving onto the 'overland flow', it is the "*water that does not infiltrate the ground surface but travels overground to reach a stream channel. It results when saturation or freezing prevent water from penetrating the earth"*.[165]

Streams, rivers, glaciers and lakes are the principal channels of drainage towards the oceans. During its cycle, water is retained by the soil, vegetation and animals. It returns to the atmosphere principally by means of evaporation and plant transpiration. Water is the first need of man, animal and plants".

[161] A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1980, Vol. II(1), para. 125.

[162] Art. 1(g) of the Convention on Cooperation for the Protection and Sustainable use of the Danube River (Danube River Protection Convention), signed in Sofia on 29 June 1994 and entered into force on 22 October 1998. The Contracting Parties include Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Moldova, Montenegro, Romania, Slovakia, Slovenia, Serbia, Ukraine and the European Union.

[163] Principle XI of the European Water Charter.

[164] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 14.

[165] Ibid., para. 15.

"Most of the rainfall which percolates through the soil layer to the underlying groundwater will eventually reach the main stream channels as groundwater flow through the zone of saturation. Since water can move only very slowly through the ground".[166] Finally, the term 'interflow' covers

"water which infiltrates the soil surface and then moves laterally through the upper soil horizons towards the stream channels, either as unsaturated flow or, more usually, as shallow perched saturated flow above the main groundwater level ... It is also called storm flow, storm seepage, and secondary base flow".[167]

Turning our attention to groundwater, first, it has to be confirmed that "*groundwater is an integral and vital part of the unbroken cycle of movement through which the supply of fresh water is continually replenished"*.[168] Second, it is also noteworthy that groundwater is the "*subject to the same physical laws and has the same properties as water on the surface or in the air. Like fresh water elsewhere, a major characteristic is that it remains in motion"*.[169] However, "Under certain geologic conditions, groundwater may be confined between impervious layers of rock".[170]

After discussing the water cycle in general and concerning the river basins, in particular, we have to make a mention of the short circuits of the cycle, namely

"Water, having fallen on the Earth's surface, may travel back into the atmosphere through any of a number of different pathways. On land, some of the precipitation will be intercepted by the vegetation and evaporated directly back into the atmosphere. Unless the soil is saturated, when overland flow may be generated, the precipitation reaching the ground enters the soil, and is either taken up by plants evaporated as transpiration, or drains through the soil to reach rivers and then the oceans, either directly or via groundwater".[171]

Finally,, it is worth shortly referring to those human activities resulting in adverse effects on water cycle including but not limited to *"deforestation, acid rain, the transformation*

[166] Ibid., para. 17.
[167] Ibid., para. 16.
[168] Ibid., para. 21.
[169] Ibid., para. 18.
[170] Ibid., para. 19.
[171] Calow, 1999, p. 148.

or removal of vegetative cover and the reduction of the number of absorptive surfaces through urbanization".[172]

In light of this analysis regarding the water cycle, the ascertainment of the European Water Charter seems to be completely correct, namely "Within a drainage basin, all uses of surface and underground waters are interdependent and should be managed bearing in mind their interrelationship";[173] moreover, relating to the whole water cycle, "It is essential to know surface and underground water resources, bearing in mind the water cycle, the quality of water and its utilisation".[174]

2.3. The characteristics and the self-purification capacity of water

In describing water from a scientific point of view, we can say that the "atoms of hydrogen and oxygen make a chemical compound known as water molecule". The chemical compound of hydrogen and oxygen as well as the properties of water are unique in many ways, among others in that sense that the formula H_2O represents not only the gaseous form of water, but it also encompasses liquid water as well as ice.[175]

First and foremost, it has to be declared that

"no water is pure or clean owing to the presence some quantities of gases, minerals and life. However, for all practical purposes, a pure water is considered to be that which has low dissolved and suspended solids and obnoxious gases as well as low in biological life. Such a high quality of water may be required only for the drinking purposes, while for other uses like agriculture and industry, the quality of water can be quite flexible and water polluted up to certain extent, in general sense, can be regarded as pure".[176]

Moving onto 'water quality', it is wort noting that this term encompasses the physical, chemical and biological character of water.[177]

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[172] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 30.
[173] Principle XI of the European Water Charter.
[174] Principle VII of the European Water Charter.
[175] Rajvaidya & Markandey, 2005, p. 1.
[176] P.K. Goel, *Water pollution: causes, effects and control, New Age International*, New Delhi, 2006, p. 1. In addition, interestingly, relating to pure water „Intense doubts arise about the question on "the water memory", i.e. whether one can somehow change the properties of pure water (without changing its chemical composition) and preserve these properties for a long time." See: V.I. Vysotskii, A.A. Kornilova & I.V. Smirnov, *Applied biophysics of activated water the physical properties, biological effects and medical applications of MRET activated water*, World Scientific Publishing Co Inc, Singapore, 2009, p. 2.
[177] S.K. Agarwal, *Water Pollution*, New Delhi A.P.H. Publ., 2009, p. 37.

First, the physical character of water will be discussed. Under this term we generally understand the clarity, the colour, the smell, the taste and the temperature of water. When it comes to water clarity (or turbidity), it can be defined as the "cloudiness or haziness in a fluid caused by individual small particles (suspended solids)". "An increase in turbidity results in a corresponding decrease in water clarity". In addition, it is noteworthy that high turbidity may be attributable to increase in algae or sediments.[178] Concerning water colour and flavour we have to note that "Chemically pure water is colorless and favourless". However, its clarity is rarely 100% under natural conditions, and it practically always has colour.[179] The colour of the water is typically measured as Hazen units or in Pt/Co units and influenced by decaying organic matter, such as iron or manganese salts.[180] Regarding the water colour, we have to draw attention to the fact that just because the water is colourless it does not mean that it is free from pollutant. Cyanide in water can be referred as an excellent example as it is colourless, but fatal to both humans and the environment,[181] even though besides man-made sources, it can be found in the nature as well.[182] As was the case with the water colour, the taste of the water is also characterised by various chemical compounds that can be found in the water.[184] Moving onto the water temperature, first, it has to be mentioned that the conversion of water to the solid state happens at a temperature of about 0 ^{o}C. This property of water is crucial , as it "ensures the preservation of the aquatic ecosystems under the ice cover in rivers and lakes".[185] Second, it is noteworthy that water temperature or more specifically "river water temperature is controlled by dynamic energy (heat) and hydrological fluxes at the air-water and water-riverbed interfaces. Land and water management impact on these drivers and, thus, modify river thermal characteristics".[186] To top it all

[178] https://www.niwa.co.nz/our-science/freshwater/tools/kaitiaki_tools/impacts/water-clarity
[179] Rajvaidya & Markandey, 2005, p. 3.
[180] M. Seneviratne, *A practical approach to water conservation for commercial and industrial facilities*, Butterworth Heinemann, Oxford, 2008, p. 38.
[181] Banning Cyanide: Banning Cyanide from Mining in the European Union Legal Analysis, Justice and Environment, Brno, 2011, p. 3.
[182] T. Mudder & M. Botz, 'Cyanide and society: a critical review', The European Journal of Mineral Processing and Environmental Protection, Vol. 4, No. 1, 2004, p. 65.; See more: Á. Bujdos, Cyanide in Gold Mining and the European Union, *in* S. Szemesi & B. Szabó (Eds.), *Profectus in Litteris 6*, Lícium-Art Könyvkiadó, Debrecen, 2015, pp. 41-49.
[184] Rajvaidya & Markandey, 2005, p. 3.
[185] Ibid. p. 4.
[186] D.M. Hannah & G. Garner, 'River water temperature in the United Kingdom: Changes over the 20th century and possible changes over the 21st century', Progress in Physical Geography, Vol. 39, No. 1, 2015, pp. 69-70.

"water temperature directly influences: distribution, predatorprey interactions, survival, growth rates, timing of life history events and metabolism of aquatic organisms in river systems. Indirectly, temperature controls instream processes such as rates of production, nutrient consumption and thus food availability, decomposition and dissolved oxygen concentration, which influence ecological processes further. In addition, water temperature is of economic importance for electric power, drinking water production and fisheries".[187]

Second, water always contains greater or smaller amount of dissolved and suspended matter. The range of chemical compound in water is 'diverse'. Generally, water components originate from natural and anthropogenic sources.[188] Each water body has its own characteristics in terms of salinity, hardness and acidity, just to name a few factors. These characteristics determine the life conditions for the aquatic ecosystems and predetermine the potential water uses.[189] Moreover, water contains organic and inorganic substances.[190] Nutrients such as silicon, nitrogen, phosphorus and iron, play an important role in the aquatic ecosystem.[191] Additionally, we have to refer to the effectiveness of water as a solvent.[192] It is a well-known fact that water is a 'universal solvent' thanks to its power to dissolve all substances to some extent. The polarity inside the water molecule "enables water to dissolve all ionic and polar substances;" however, non-polar compounds are insoluble in water.[193] Thanks to the solvent power of water, the run-off from the land always contains dissolved materials which differ from time to time and place to place.[194] As water "always contains impurities, which impart colour, clarity, taste, smell and feel," we cannot find pure water in nature.[195] Besides, water "*has enormous capacity to absorb heat, and is consequently an immense source of energy when it releases heat. Such qualities play an integral part in the various uses".*[196] Finally, concerning sea water it has to be mentioned that chlorinity and salinity are commonly

[187] Ibid., pp. 68-69.
[188] N.I. Alekseevskiy, Properties of Rivers, Streams, Lakes and Wetlands, *in* M. Gaykovich Khublaryan (Ed.), *Types and properties of water. / Vol. 2, Properties of atmospheric water*, Eolss Publishers Co Ltd, Oxford, 2009, p. 6.
[189] Alekseevskiy, 2009, p. 6.
[190] Agarwal, 2009, p. 37.
[191] Alekseevskiy, 2009, p. 7.
[192] Rajvaidya & Markandey, 2005, p. 3.
[193] Seneviratne, 2008, p. 25.
[194] Rajvaidya & Markandey, 2005, p. 5.
[195] Seneviratne, 2008, p. 25.
[196] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 31.

used to describe its composition.[197] Interestingly, when it comes to open oceans, the salinity averages about 35 per cent but rises to as much 40 per cent thanks to high evaporation as well as low precipitation and inflow.[198]

Third, turning our attention to the biological characteristics, the organisms being present in the water have to be referred to.[199] In this context it is worth recalling the European Water Charter, which explains the relationship between water pollution and the organisms, as it states that

"To pollute water is to harm man and other living creatures which are dependent on water. Water in nature is a medium containing beneficial organisms which help to keep it clean. If we pollute the water, we risk destroying those organisms, disrupting this self-purification process, and perhaps modifying the living medium unfavourably and irrevocably. Surface and underground waters should be preserved from pollution. Any important reduction of quantity and deterioration of quality of water, whether running or still, may do harm to man and other living creatures".

Moreover,

"The quality of water must be maintained at levels suitable for the use to be made of it and, in particular, must meet appropriate public health standards. These quality levels may vary according to the different uses of water, namely food supplies, domestic, agricultural and industrial needs, fisheries and recreation. Nevertheless, since all life on earth in its infinite variety depends upon the manifold qualities of water, arrangements should be made to ensure as far as possible that water retains its natural properties". In addition, relating to the self-purification capacity of freshwater, it has to be shortly mentioned that

"Water has the ability to cleanse itself. The water flowing in rivers and streams is capable of self-purification in two ways. First, it is able to disperse wastes either through its flowing motion, which dissolves waste particles or causes them to break up and settle at the river bottom, or through the supply of fresh water that continually enters the watercourse. Secondly, oxygen reacts chemically with wastes to convert them into harmless substances or acts as host to bacteria which consumes sewage and other organic wastes. However, the supply of oxygen absorbed by a river from the air or from plants can be exhausted; when an overload of waste enters the stream, the river may

[197] Rajvaidya & Markandey, 2005, p. 13.
[198] Ibid. p. 14.
[199] Agarwal, 2009, p. 37.

become unable to purify itself".[200] Further, "groundwater is able to perform these two functions to a lesser degree".[201]

2.4. The relationship between water uses and water pollution

Water uses can be classified in many ways; however, as from our research point of view merely the qualitative aspect of water is relevant (though it can be interrelated with water quantity), we will focus on the relationship between water pollution and water use instead of giving a comprehensive review relating to the complex system of water uses. First and foremost, it is worth referring to the differentiation between navigational and non-navigational uses as the title of one of our most important sources, namely the Watercourses Convention contains the phrase 'non-navigational uses'. Relating to this type of classification it has to be noted that traditionally navigation had a priority over other uses. As explained in the Commentary of the Helsinki Rules,

"Historically "navigable waterways of international concern" were devoted primarily to navigational uses. With the exception of rivers on which the floating of rafts is regarded as navigation, there is no rule of international law according to which the riparian States to a watercourse used for navigation should be under an obligation to allow its use for timber purposes".[202]

However, as stated in the IIL's Madrid Declaration under the title of International Regulations Regarding the Use of International Watercourses for Purposes Other than Navigation that "*International law has dealt with the right of navigation with respect to international rivers but the use of water for the purposes of industry, agriculture, etc. was not foreseen by international law".*[203]

In scrutinizing the preparatory documents of the Watercourses Convention, it can be concluded that special attention was devoted to the classification of water uses. As highlighted in the Commentary of the Watercourses Convention

"*International river waters are used for non-navigational purposes in various ways which cannot be listed exhaustively for two reasons: Firstly, these uses differ according to the States concerned and the extent of their needs and also according to their geographical*

[200] A/CN.4/320 and Corr.1, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission,* 1979, Vol. II(1), para. 22.
[201] Ibid., para. 23.
[202] Commentary of ILA's Helsinki Rules on Article XXII.
[203] Institute of International Law, Madrid Declaration under the title of International Regulations Regarding the Use of International Watercourses for Purposes Other than Navigation

location, economic and social situation and cultural progress. (...) Secondly, the uses differ and change with the passage of time. The uses deemed appropriate by a State today may be replaced by a variety of others tomorrow".[204]

Without digging ourselves into this debate, it is pertinent to refer to the questioner was circulating among the states with the following question:

"Should the Commission adopt the following outline for fresh water uses as the basis of its study?

(a) Agricultural uses: 1. Irrigation-, 2. Drainage; 3. Waste disposal; 4. Aquatic food production;

(b) Economic and commercial uses: 1. Energy production (hydroelectric, nuclear and mechanical); 2. Manufacturing; 3. Construction; 4. Transportation other than navigation; 5. Timber floating; 6. Waste disposal; 7. Extractive (mining, oil production, etc.);

(c)Domestic and social uses: 1. Consumptive (drinking, cooking, washing, laundry, etc.); 2. Waste disposal; 3. Recreational (swimming, sport, fishing, boating, etc.)".[205]

As can be seen, this approach differentiates between three groups of uses, namely agricultural, industrial and domestic use. It is worth noting that this classification is still sound, but concerning the sub-groups there were disagreements among the states in the past and it is highly unlikely that it would be possible to agree in a unified system in the present that is primarily attributable to the fact that

"Each watercourse is unique. Each has a special congeries of uses which differs from that of any other system. One may be used principally for drinking and household purposes, another for irrigation, a third for industrial production and a fourth for hydroelectric production. Normally, of course, a river serves—or has the potential for serving—a variety of uses. Yet there are rivers in which one or two uses predominate at a given time, and these uses may differ from one watercourse to the next".[206]

Although it is beyond our goal to discuss it further, the reason behind taking a look at it was to point out that the largest proportion of water uses, as mentioned before, are

[204] A/CN.4/314, Replies of Governments to the Commission's questionnaire, *Extract from the Yearbook of the International Law Commission*, 1978, Vol. II(1), p. 258.
[205] A/CN.4/294 and Add.1, Replies of Governments to the Commission's questionnaire, p. 168.
[206] A/CN.4/320, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 64.

attributable to domestic use, agricultural use and industrial use and these uses are the main the sources of the water pollution as well.[207]

Lastly, it is possible to differentiate between consumptive water use (water that evaporates or transpires, or is incorporated into a product or a crop, consumed by humans or animals or otherwise removed from the immediate environment)[209] and non-consumptive water use (e.g. such as inland capture fisheries and aquaculture, hydropower, navigation and recreation)[210] have to be mentioned. First, concerning this differentiation we have to refer

"to water's destiny after use: whether consumptive (evaporating) water use or water use that is throughflow based and results in a return flow carrying a content of pollutants. Water use for domestic and industrial purposes is basically a throughflow-based use along an intake/use/outflow chain, often picking up pollutants during use, leading to river pollution, and calling for wastewater treatment to reduce contamination".[211]

However, we have to highlight that the relationship between water use and water pollution is not evident thanks to new opportunities, such as low waste or no waste technologies.[212] Similarly, not-consumptive water use is not equal with the lack of pollution that can be the best illustrated with vessel sources river pollution. Not to mention those cases when pollution is caused without water use from the river bank. e.g. nitrate from agriculture or accidental pollution

2.5. Classification of water pollution and pollutants

First and foremost, it is crucial to differentiate between natural and man-made water pollution. In the first case, the pollution is the result of natural factors (e.g. earthquakes, volcanoes or floods), which can even though cause detrimental environmental harm, but are excluded from the scope of the legal rules.[213]

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[207] J. Chenoweth, 'Minimum water requirement for social and economic development, *Desalination*, Vol. 229, No. 1-3, 2008, p. 248.

[209] J. Rogers, Glossary, *in* B. Aylward, B.Kiersch, N. Petralli & J. Vapnek (Eds.), *Law for Water Management: a guide to concepts and effective approaches*, FAO, Rome, 2009, p. x.

[210] B. Aylward, N. Petralli, J. Vapnek & B. Kiersch, Water resources and management, *in* B. Aylward, B.Kiersch, N. Petralli & J. Vapnek (Eds.), *Law for Water Management: a guide to concepts and effective approaches*, FAO, Rome, 2009, pp. 42-44.

[211] M. Falkenmark, Water and the Next Generation – Towards a More Consistent Approach, in A.K. Biswas, C. Tortajada, & R. Izquierdo-Avino (Eds.) *Water Management in 2020 and Beyond*, Water Resources Development and Management Springer, 2009, p. 66.

[212] Art. 3(1)a) of the Water Convention.

[213] Hanqin,2003, p. 6. See interestingly: Art. 1 of 1956 Agreement between the Soviet Union and Czechoslovakia requires the parties to ensure that the waters are kept clean and not artificially polluted or fouled in any way.

Secondly, in terms of the sources of water pollution, two broad categories can be separated, namely point and non-point sources.[214] In case of non-point pollution, it is difficult or sometimes impossible to determine the individual sources of the contamination,[215] so controlling is much harder compared to point sources, where the pollutants are discharged from identifiable sources such as pipes or channels.[216]

As described by the Danube River Protection Convention,

"Point and non-point sources of water pollution" means the sources of pollutants and nutrients the input of which to waters is caused either by locally determined discharges (point source) or by diffuse effects being widespread over the catchment areas (non-point sources)".[217]

In addition, fortunately, we can also rely on the counterpart of these definitions relating to land-based marine pollution. Embarking upon 'point sources', this term can be defined as "*land-based sources of pollution where emissions are introduced into the environment from any discernible, confined and discrete conveyance, including but not limited to pipes, outfalls, channels, ditches, tunnels, conduits or wells from which pollutants are or may be discharged"*. Moving onto 'diffuse sources', these are

"land-based sources of pollution, other than point sources, from which substances enter the environment as a result of land run-off, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification or destruction of habitats".[218]

Moreover, it has to be noted that another way to classify water pollution based on its sources is the aforementioned classification of agricultural, domestic and industrial pollution. In addition, UNCLOS has to be mentioned that provides us a comprehensive

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[214] C.E. Boyd, *Water Quality: An Introduction*, Kluwer Academic Publishers, Boston (MA), 2000, p. 252.; R.A. Matthews, P A. Vesilind & R.F. Weiner, *Environmental Engineering*, Butterworth-Heinemann, Amsterdam, 2003, p. 51. See also: Art. 9(2)f) of the Water Convention states that "The agreements or arrangements mentioned in paragraph 1 of this article shall provide for the establishment of joint bodies. The tasks of these joint bodies shall be, inter alia, and without prejudice to relevant existing agreements or arrangements, the following: To develop concerted action programmes for the reduction of pollution loads from both point sources (e.g. municipal and industrial sources) and diffuse sources (particularly from agriculture)." Art. 21(3)b) of the Watercourses Convention stipulates that "Watercourse States shall, at the request of any of them, consult with a view to arriving at mutually agreeable measures and methods to prevent, reduce and control pollution of an international watercourse, such as: Establishing techniques and practices to address pollution from point and non-point sources".

[215] W. D. Shaw, *Water Resource Economics and Policy: An Introduction*, Edward Elgar, Cheltenham, 2005, p. 156.

[216] M.K. Hill, *Understanding Environmental Pollution: A Primer*, 2nd ed, Cambridge University Press, Cambridge, 1997, p. 201. Remark: The content of the terms Point and non-point sources of water pollution has been chrystalised, so the different definitions describe the same thing with different words.

[217] Art. 1(f) of the Danube River Protection Convention.

[218] Art. 2(h)(i) of Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources and Activities to the Framework Convention for the Protection of the Marine Environment of the Caspian Sea.

review concerning the sources of sea water, such as pollution from land-based sources,[219] pollution from seabed activities subject to national jurisdiction,[220] pollution by dumping,[221] pollution from vessels[222] and pollution from or through the atmosphere.[223]
Thirdly, it is crucial to distinguish between non-accidental (chronic or continuous) as well as accidental (extraordinary) water pollution. While non-accidental pollution occurs because of a continuous process or activity,[224] whereas accidental water pollution arises from a sudden and unforeseeable event.[225] In this latter case, the water is contaminated with much higher concentration of the pollutants and/or with particularly hazardous substances within a relatively short time period.[226]

Turning our attention to water pollutants, first, we can tell apart "primary pollutants which exert harmful effects in the form in which they enter the environment" from "secondary pollutants, which are synthesized as a result of chemical processes, often from less harmful precursors, in the environment".[227]
Second, water pollutants can be toxic (e.g. heavy metals), which cause harm to living organisms, or non-toxic (e.g. sediments), which are although not poisonous, they may cause significant environmental problems.[228] It has to be mentioned relating to this classification that
"Although highly toxic substances are responsible for many cases of environmental pollution, under some circumstances materials which are normally considered harmless may cause pollution if they are present in excessive quantities or in the wrong place at the wrong time".[229]
Third, it is reasonable to continue our train of thought with the classification of substances based on their toxicity. Starting with 'hazardous substances', they can be defined as "substances which are toxic, carcinogenic, mutagenic, teratogenic or bio-accumulative, especially when they are persistent,"[230] or alternatively, a strikingly similar definition,

[219] Art. 207 of the UNCLOS.
[220] Art. 208 of the UNCLOS
[221] Art. 210 of the UNCLOS
[222] Art. 211 of the UNCLOS.
[223] Art. 212 of the UNCLOS.
[224] Hanqin, 2003, p. 13.
[225] Ibid. p. 11.
[226] T. Faragó & Zs. Kocsis-Kupper, *Accidental Transboundary Water Pollution: Principles and Provisions of the Multilateral Legal Instruments*, World Wide Fund for Nature (WWF), Hungarian Programme Office and Office of the Government Commissioner for the Tisza and Szamos Rivers, 2000, p. 6.
[227] Alloway & Ayres, 1997, p. 5.
[228] Shaw, 2005, p. 66.
[229] Alloway & Ayres, 1997, p. 5.
[230] Art. 1(6) of the Water Convention.

"substances which have toxic, cancerogenic, mutagenic, teratogenic or bioaccumulative effects, in particular those being persistent and having significant adverse impact on living organisms".[231] Interestingly, Danube River Protection Convention also adopted a definition with a narrower scope, namely 'substances hazardous to water' that are determined as "*substances the hazard potential of which to water resources is extraordinarily high so that their handling requires special preventive and protective measures".*[232] It can be noted relating to this solution that, on the one hand, it can be justified that a convention being devoted to water protection in its entirety besides defining 'hazardous substances' in general, devotes a separate definition relating to 'substances hazardous to water' in particular. However, on the other hand, it has to be kept in mind, that in default of a reference to 'hazardous substances' in general, we can have the impression that the relationship between the environmental elements is not taken into account and water is handled in an isolated way from the other elements. In addition, "harmful substances" can be mentioned; however, this category will be examined while analysing Article 1(4) of the UNCLOS.

Lastly, it is important to keep in mind that pollutants can often reach water via other environmental elements, such as land or air. Sometimes they cycle among all of them.[233] Consequently, improving freshwater quality, as mentioned before, can contribute not just to the protection of the marine environment, but other environmental elements.

2.6. Water and the sustainable development

Numerous principles of the international environmental law can be invoked concerning water resources including but not limited to the preventive principle, the precautionary principle, the sustainable development and the polluter pays principle, just to name a few examples. However, a detailed examination of all of them cannot be justified. On the one hand, it would far exceed the goal of this dissertation; on the other hand, practically all these principles could be the topic of a separate dissertation. That is why merely one of them, namely the sustainable development[234] will be discussed this time. It was chosen with the aim to flash some important links relating to freshwater and sea water quality. Besides, putting aside our argumentation concerning the scope of this dissertation a deeper analysis cannot be justified as Hildering devoted an excellent comprehensive book

[231] Art. 1(d) of the Danube River Protection Convention.
[232] Art. 1(e) of the Danube River Protection Convention.
[233] Hill, 1997, p. 201.
[234] Sands & Peel, 2012, p. 206. See, interestingly, L. Fodor, 'Fenntarthatósági indikátorok a jogi szabályozás hatásvizsgálatában', Pázmány Law Working Papers 4, 2012, pp. 1-8.

to the freshwater aspect of sustainable development from international law point of view under the title *International Law, Sustainable Development and Water Management*.[235]

Before starting our analysis, we have to shortly refer to the roots of the sustainable development. It dates back to the Report of the World Commission on Environment and Development: Our Common Future in 1987, which is often referred to as 'the Brundtland report'. Based on this report, *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".*

As part of our analysis, first, we will take a look at the sources being relevant for our research to check how this principle was adopted by the universal and regional agreements addressing water. Second, we will pay special attention to the Rhine Convention[236] and the Antigua Convention[237] as both provide us a definition relating to sustainable development and by this way they prove to be invaluable sources to embody the relationship between sustainable development and water in a multilateral agreement.

First, one can observe that the phrase sustainable development can be detected in several forms such as 'sustainable development,'[238] l 'sustainable development of an international watercourse'[239] and „sustainable development of the coastal areas through the integrated approach to development of coastal areas".[240] The second group can be formed by phrases relating to 'sustainable use' and 'sustainable utilisation'.[241] The former can be detected in the expressions such as 'sustainable use of transboundary waters,'[242] 'sustainable use of natural resources',[243] 'sustainable use of the marine and coastal

[235] A. Hildering, *International Law, Sustainable Development and Water Management,* Eburon Academic Publishers, Delft, 2004.
[236] Convention on the Protection of the Rhine, signed in Rotterdam on 22 January1998. The Contracting Parties are: Germany, France, Luxembourg, the Netherlands, Switzerland and the European Union.
[237] Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua Convention), adopted on 18 February 2002.
[238] Preamble of the Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities.; Art. 10(1)(2) on Integrated management and sustainable development of the marine and coastal environment; Art. 12(1); Art. 10(3) of the Protocol Concerning the Protection of the Marine Environment from Land-Based Activities in the Red Sea and Gulf of Aden.; Preamble of Protocol Concerning Pollution from Land-based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.
[239] Art. 24 of the Watercourses Convention on Management.
[240] Art. 4(2)g) of the Protocol for the Protection of the Caspian Sea against Pollution from Land-based Sources and Activities to the Framework Convention for the Protection of the Marine Environment of the Caspean Sea.
[241] Preamble and Art. 5 on Equitable and reasonable utilization and participation of the Watercourses Convention. refers to the 'sustainable utilisation of international watercourses'
[242] Preamble of the Water Convention.
[243] Art. 15 of the Helsinki Convention.

environment and its natural resources',[244] 'sustainable use of biological diversity'[245] and the 'sustainable use of living resources'.[246] Additionally, regarding living resources the phrase 'sustainable yield' has to be mentioned.[247] As can be seen, 'sustainable use' can be connected to water in general or to its natural resources in particular (more specifically to the biological diversity or to the living resources). Finally, some phrases are worth noting relating to the management such as 'sustainable water management,'[248] 'sustainable water-resources management'[249] and 'sustainable management of the maritime area'.[250]

We are fortunate that besides the definition of sustainable development provided by the Brundtlandt report, a freshwater and a sea water document,[251] more specifically the Convention on the Protection of the Rhine and the Antigua Convention gives us an insight into the intersection between sustainable development and water.

Embarking upon Article 3 of the Convention on the Protection of the Rhine, it states that *"sustainable development of the Rhine ecosystem, in particular through:*

(a) maintaining and improving the quality of the Rhine's waters, including the quality of suspended matter, sediments and ground water, notably by

- preventing, reducing or eliminating as far as possible pollution caused by noxious substances and by nutrients from point sources (e.g. industry and municipalities) and diffuse sources (e.g. agriculture and traffic) - including that from groundwater - and pollution from shipping;

- ensuring and improving the safety of installations and preventing incidents and accidents;

(b) protecting populations of organisms and species diversity and reducing contamination by noxious substances in organisms;

[244] Preamble of the Antigua Convention.
[245] Art. 2 of Annex V On the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area of the OSPAR.
[246] Annex I,C, j of Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region, signed in Grand-Bassam, Cote d'Ivoire on 22 June 2012.
[247] Art. 61(3) and Art. 119(1)a) of the UNCLOS.; Art. 14(1)b) of the Tehran Convention.
[248] Preamble of the Water Convention.
[249] Art. 3(1)l) of the Water Convention.
[250] Preamble of the OSPAR Convention.
[251] Remark: We opted for these souces as only these conventions concerning water contained description relating to sustainable development. In looking for the sources, universal, regional and bilateral agreements were examined.

(c) maintaining, improving and restoring the natural function of the waters; ensuring that flow management takes account of the natural flow of solid matter and promotes interactions between river, ground water and alluvial areas; conserving, protecting and reactivating alluvial areas as natural floodplains;

(d) conserving, improving and restoring the most natural habitats possible for wild fauna and flora in the water, on the river bed and banks and in adjacent areas, and improving living conditions for fish and restoring their free migration;

(e) ensuring environmentally sound and rational management of water resources;

(f) taking ecological requirements into account when implementing technical measures to develop the waterway, e.g. for flood protection, shipping or the use of hydroelectric power;

2. the production of drinking water from the waters of the Rhine;

3. improvement of sediment quality in order that dredged material may be deposited or spread without adversely affecting the environment;

4. general flood prevention and protection, taking account of ecological requirements;

5. to help restore the North Sea in conjunction with the other actions taken to protect it".

As can be seen, even though this approach does not provide us an exhaustive list, nonetheless, it is highly unlikely that it is possible to establish such a list , it gives us a comprehensive review of the elements of the sustainable development relating to a river. Not surprisingly, we can find reference to both water quality and quantity. Besides water management such as flood, the navigation, the relationship between freshwater as well as the marine environment is also mentioned. Interestingly, the dominance of the environmental provisions can be observed; however, it is easy to identify the economic interests such as navigation or fishery. Moreover, the social dimension is flashed in the form of drinking water.

In sharp contrast to the Convention on the Protection of the Rhine, Antigua Convention adopted a rather general approach, which looks strikingly similar to the Brundtland report as it determines 'sustainable development' as

"the process of progressive change in the quality of life of human beings, which places it as the centre and primordial subject of development, by means of economic growth with social equity and the transformation of methods of production and consumption patterns, and which is sustained in the ecological balance and vital support of the region. This process implies respect for regional, national and local ethnic and cultural diversity, and

the full participation of people in peaceful coexistence and in harmony with nature, without prejudice to and ensuring the quality of life of future generations".[252]

In analysing the principle of sustainable development, we will rely on the three inter-related pillars of the sustainable development, namely the social, economic and environmental pillars.[253] Under the environmental pillar we understand the general characteristics of water including, among others, the self-purification as well as the renewable capacity of water and the different processes in the water cycle. Nonetheless, our analysis regarding water as a natural resource provided us all the necessary information relating to the environmental pillar , so our examination will be restricted to the other pillars this time. Generally, it can be stated concerning the social and economic uses of freshwater that they can vary widely not just among, but also inside countries.[254]

Firstly, the social pillar, which covers the right to water as well as its connection with other rights will be discussed.[255] However, before doing so, it is crucial to clarify relating to human right to water that it is necessarily related to freshwater, more specifically to the "continuing contamination, depletion and unequal distribution of water" that result in the "exacerbating existing poverty".[256] When it comes to studying water from the human perspective, it is important to note that traditionally the international regulation of water resources was approached from the perspective of the state based on territoriality and state sovereignty. However, a shift has emerged from the state to individual level.[257] In 2002, the United Nations Economic and Social Council adopted General Comment No. 15 that contributed to the clarification and determination of the scope of the right to water and provided a guideline for states based on Article 11 and 12 of the International Covenant on Economic, Social and Cultural Rights.[258] The General Comment No. 15 determines that *"the human right to water entitles everyone to sufficient, safe, acceptable,*

[252] Art. 3(1)a) of the Antigua Convention
[253] T. Strange & A. Bayle, *Sustainable Development: Linking economy, society, environment*, OECD, 2008, p. 27.; Mainstreaming of the three dimensions of sustainable development throughout the United Nations system: Report of the Secretary-General, A/70/75–E/2015/55;
[254] Strange & Bayle, 2008, p. 32.
[255] L. Fodor & Á. Bujdos, Right to Environment and Right to Water in the Hungarian Fundamental Law, *in* V. Greksza & M. Szabó (Eds.), *Right to Water and the Protection of Fundamental Rights in Hungary*, University of Pécs, Pécs, 2013, pp. 34-48.; Á. Bujdos, Human Right to Water, *in* S. Szemesi and B. Szabó (Eds.), *Profectus in Litteris 5*, Debrecen, 2013, pp. 63-71.
[256] General Comment No. 15: The Right to Water (Arts. 11 and 12 of the Covenant), adopted at the Twenty-ninth Session of the Committee on Economic, Social and Cultural Rights, on 20 January 2003.
[257] T. Kiefer & C. Brölmann, 'Beyond State Sovereignity: The Human Right to Water', *Non-St Actors & Int'l L*, Vol. 5, 2005, pp. 183-184.
[258] General Comment No. 15 on the right to water (Arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), 2002.

physically accessible and affordable water for personal and domestic uses". 28 July 2010 can be considered a milestone when the UN General Assembly recognized "the right to safe and clean drinking-water and sanitation as a human right that is essential for the full enjoyment of life and all human rights".[259] In September 2010, the Human Rights Council affirmed that

"the human right to safe drinking-water and sanitation is derived from the right to an adequate standard of living and inextricably related to the right to the highest attainable standard of physical and mental health, as well as the right to life and human dignity".[260]

Not surprisingly, while in the developing countries mainly the access to clean drinking-water and sanitation causes serious problems,[261] in the developed countries the right to water is indicated mainly, but not exclusively, in connection with the enjoyment of other human rights. Among them, it is worth stressing the significance of water in connection with culture, various religions as well as indigenous rights.[262] The role of water in the flourish of cultures and cultural diversity is recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as a driving force of development.[263] In indigenous cultures there is a strong relationship between humans and nature, as nature has played central role within indigenous beliefs.[264] The spiritual significance of water for indigenous people is ensured in the United Nations Declaration on the Rights of Indigenous Peoples.[265] Due to their prominent importance, spiritual values can also play a role in establishing water quality standards.[266]

As indicated earlier, water has several functions, so right to water can be approached from several aspects. The human rights approach puts the people's need first in comparison with other uses. It is especially used to challenge the economic and social injustice

[259] *The human right to water and sanitation* GA Res. 64/292 (2010).
[260] *Human rights and access to safe drinking water and sanitation* HRC Res. 15/L.14 (2010).
[261] R. Pink, 'Child rights, right to water and sanitation, and human security', *Health and Human Rights*, Vol. 14, No. 1, 2012, p. 3.
[262] S. McIntyre-Tamwoy, 'The Cultural Heritage of Water' (18 April 2011) International Day for Monuments and Sites <www.icomos.org> p. 1.; Viewpoints: Santa Cruz Declaration on the Global Water Crisis, Water International, Vol. 39, No. 2, 2014, p. 248.
[263] I.J. Klaver, Introduction: Water and Cultural Diversity *in* B.R. Johnston (Ed.), *Water, Cultural Diversity, and Global Environmental Change: Emerging Trends, Sustainable Futures?*, Springer, Dordrecht, 2012, p. 3.
[264] Fisher-Ogden & Ross Saxer, 2006, p. 91.
[265] Art. 25 of the *United Nations Declaration on the Rights of Indigenous Peoples* 61/295, (2007)..
[266] Fisher-Ogden and Ross Saxer, 2006, p. 109.

affecting the most vulnerable groups,[267] and it is supposed to be a better way to respond to water scarcity than the traditional approach that handles water as a commodity.[268]

Before continuing our analysis regarding the economic pillar of the sustainable development, it is worth revoking the International Conference on Water and the Environment (ICWE) in 1992[269], during this conference, the Dublin Statement and the Conference Report were adopted, among others, the Dublin Principle No. 4,[270] which states that "Water has an economic value in all its competing uses and should be recognized as an economic good".However, this approach does not contradict to the human right to water approach what can be best detected in the explanation added to Dublin Principle No. 4, namely

"Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources".

After clarifying the relationship between the social and the economic pillar, we will turn our attention to the economic one. Embarking on the observations of Gleick and Morrison, we have to note that they warn that both water quantity and quality pose increasing and direct threat to the companies in the upcoming decades.[272] As explained further, one part of the companies struggle with the competition for water as a result of water shortages, others suffer from the declining water quality.[273] Concerning water quality problems, it has to make a mention that, unfortunately, pollution (or more

[267] S. Klawitter & H. Qazzaz, Water as a Human Right: Understanding of Water in the Arab Countries of the Middel East, *in* H. Shuval & H. Dweik (Eds), *Water Resource in Middle East: Israel-Palestinian Water Issues – From Conflict to Cooperation*, Springer, Berlin, Heidelberg, 2007, p. 284.
[268] M. Fitzmaurice, 'The Human Right to Water', *Fordham Environmental Law Review*, Vol. 18, No.3, 2007, p. 539.
[269] International Conference on Water and the Environment took place in Dublin, Ireland, on 26-31 January 1992. Remark: We will refer to the ICWE when analysing the principle of sustainable development, more specifically The Dublin Statement on Water and Sustainable Development, adopted January 31, 1992 in Dublin, Ireland.
[270] The Guiding Principles are: Principle No. 1 - Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; Principle No. 2 - Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels; Principle No. 3 - Women play a central part in the provision, management and safeguarding of water; and Principle No. 4 - Water has an economic value in all its competing uses and should be recognized as an economic good.
[272] Gleick & Morrison, 2012, p. 146.
[273] Ibid. p. 148.

specifically water pollution) is the by-product of our consumer-based world[274] as producing goods and services that are necessary to our everyday life is not possible without generating some pollution. Otherwise, production in non-polluting ways would generate large additional expenses for companies.[275] Nonetheless, poor water quality can affect industrial production in two ways. On the one hand, certain sectors claim high water quality, so the pollution of the local water resources force them to invest into costly new technologies or to move somewhere else. On the other hand, in certain regions, government efforts establish such kind of water quality standards, which are sufficient to prevent the unregulated wastewater discharge. Further, water pollution can trigger drastic changes in the industrial activity of the region in question, as certain industries claim high water quality to the production such as food and pharmaceutical companies,[276] so the situation of these companies is particularly vulnerable to water pollution.[277] Consequently, in some countries governments try to restrict the type, the size and the location of the polluters in order to improve water quality.[278] Nevertheless, it is needless to say that the negative effects of the poor water quality do not stop at the level of the companies or certain sectors (industry and agriculture), but they also influences the national strategies for economic development.[279] The said negative effects concerning companies constitute one type (namely, production-production) [280] of the so-called negative externality.[281] Negative externalities are the results of market failures, and both production-production and production-consumption externality can be observed concerning water.[282] In case of production-consumption externality, the pollution can reduce the amenity function of certain water bodies and limit their recreational value,[283] however, in more serious cases, polluted water can also have negative impact on human health.[284]

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[274] N.E. Marion, *Making Environmental Law: The Politics of Protecting the Earth*, Praeger, Santa Barbara, 2011, p. 5.
[275] Perman et al., 2003, p. 170.
[276] Gleick & Morrison, 2012, p. 148.
[277] Ibid. p. 147.
[278] Ibid. p. 148.
[279] P.H. Gleick et al., *The World's Water 2006-2007: The Biennial Report on Freshwater Resources*, Island Press, Washington, 2006, p. 149.
[280] Perman et al., 2003, pp. 139-140.
[281] "An externality exists when the activities of an acting party influence the welfare of an affected party and the acting party does not consider the how its activities affect the welfare of the affected party." Tony Prato *Natural Resource and Environmental Economics*, Iowa State University Press, Ames, 1998,p. 100.
[282] Perman et al., 2003, pp. 139-140.
[283] MacDonald Gibson et al., 2013, p. 264.
[284] Ibid. p. 266.; http://www.who.int/water_sanitation_health/diseases-risks/diseases/diseasefact/en/

After discussing the relationship between human right to water and the water price as well as the economic impact of water pollution, we will shortly examine water as a commodity.[285] Traditionally, many jurisdictions treated water as a common good rather than a commodity,[286] which resulted in the undervaluation of water. Because of this, wasteful and inefficient use of water can be observed that triggers problems, among others, when negatively affected third parties have to be compensated.[287] On the one hand, the proponents of water as a commodity approach argue that water pricing can ensure the sufficient supply, because in the absence of water price, there is no incentive to conserve it. Furthermore, by recognizing the economic and social value of water, it is possible to compare it with other social and economic goods that can express its scarce and irreplaceable character.[288] On the other hand, however, the opponents of this approach reason that it can pose a threat to those communities and cultural values that are strongly connected to the traditional uses of water as well as to the ecological values and services that water provides.[289]

Interestingly, in international trade water as a commodity appears mainly in virtual form.[290] Virtual water is the water embedded in the product, in other words, water that is used in the production process of agricultural or industrial products. Not surprisingly, it gained attention especially concerning food production,[291] as approximately 80 per cent of the consumptive use of freshwater is attributable to agricultural sector in the world. Consequently, the trade of the agricultural products and the water they embody have triggered concerns. That is why the international trade of these products is crucial as countries with rich water resources can benefit by becoming net exporters of these goods and services, whereas water scarce countries can conserve their domestic water resources

[285] H.C. Dunning, 'Reflections on the Transfer of Water Rights', *Journal of Contemporary Law*, Vol. 4, 1977, pp. 109-117.
[286] B.H. Thompson, Jr., 'Water as Public Commodity' *Marquette Law Review*, Vol. 18, 2011, 25.
[287] B. Mitchell, 'The Value of Water as a Commodity', *Canadian Water Resources Journal*, Vol. 9, No. 2, 1984, p. 30.
[288] Boberg, 2005, p. 85.
[289] S.E. Gaines, 'Fresh Water: Environment or Trade', *Canada-United States Law Journal*, Vol. 28, 2002, pp. 167-168.
[290] Hoekstra, 2010, p. 1.
[291] D. Renault, 'Value of Virtual Water in Food: Principles and Virtues', paper presented to UNESCO-IHE Workshop on Virtual Water Trade, Delft, December 2002. See also: S. Merrett, J.A. Allan & C. Lant, 'Virtual Water - the Water, Food, and Trade Nexus Useful Concept or Misleading Metaphor?', *Water International*, Vol. 28, No. 1, 2003, pp. 4-11.; A.Y. Hoekstra & P.Q. Hung, *Virtual Water Trade (A Quantification of Virtual Water Flows between Nations in Relation to International Crop Trade)*, IHE, Delft, 2002, p.10.; M.M. Mekonnen & A.Y. Hoekstra, *National Water Footprint Accounts: The Green, the Blue and Grey Water Footprint of Production and Consumption*, UNESCO-IHE Institute for Water Education, Delft, 2011.

by importing these products instead of producing locally. This solution seems to be easier than transporting the water from one country into another one in order to produce the same commodity.[292] Water footprint illustrates this theory by involving the footprint of the product, the source and the receiving country of the product embodying the water.[293] It is constituted by three types of water uses, such as blue, green and grey water. 'Blue water' refers to the consumption of surface and groundwater, the 'green water' symbolises the volume of rainwater consumed and 'grey water' is the degree of freshwater pollution.[294] In addition, a worrying trend can be observed, namely numerous countries, among others China, India and Saudi Arabia, with scarce water resources and large population (or those countries who are rich thanks to petroleum) are hunting for other countries to acquire fertile land and water resources in order to grow crops there, which will be later exported to their own country for domestic consumption. The acquisition of the foreign land including its water resources ensures the food security for their own population. It can be said about these transfers that some of them are carried out as purchase, whereas others as leases of 50 to 99 years.[295]

Finally, it has to mentioned that several international organisations support the commodity approach to handle water. World Trade Organisation (WTO) is probably the most significant among them; however, unlike Dublin Principles No. 4, it only concentrates on the interests of the international trade and the sustainable water use is outside of its scope. Notwithstanding, water pollution is linked to the global economic system to such an extent that it is not possible to handle it independently from the global economy.[296] That is why; WTO's ongoing Doha Round should include provisions that promote sustainable water use in agricultural sector.[297] Besides WTO, both World Bank and International Monetary Found (IMF) are in favour of the commodity approach and they support full-cost pricing of water.[298]

[292] Brown Weiss, 2012, pp. 160-161.
[293] C. Perry, 'Water Footprints: Path to enlightenment, or false trail?', *Agricultural Water Management*, Vol. 134, 2014, p. 119.
[294] Mekonnen and Hoekstra, 2011, p. 9.
[295] Brown Weiss, 2012, pp. 161-162.
[296] Hoekstra, 2010, p. 10.
[297] Ibid. p. 2.
[298] Thompson, 2011, p. 25.

2.7. River as a boundary line

In order to properly understand why we have to deal with river boundaries concerning water pollution, we have to take a glimpse at the Convention on the Rights and Duties of States, which clarifies those qualifications a state has to possess as a person of international law, namely permanent population, defined territory, government and capacity to enter into relations with the other States.[299] Consequently, as indicated above, the territory forms part of these requirements that promptly raises the question what the limits of the territory are regarding rivers.

Before starting with the analysis on how to fix state boundaries, we cannot postpone clarifying the meaning of two terms, namely 'boundary' and 'frontier'. Embarking upon the term 'frontier', it is used in two senses. On the one hand, it is employed as a boundary line; on the other hand, it covers a zone.[300] In order to avoid this confusing situation, it is a universally accepted approach that *"boundary denotes a line whereas a frontier is more properly a region or zone having width as well as length and, therefore, merely indicates, without fixing the exact limit, where one state ends and another begins".* [301] Based on this clarification, it must be clear why the term boundary is used concerning water. Nonetheless, interestingly, it is worth mentioning another attempt to define boundary, namely boundaries are

"the limits of a territory over which a State is entitled to exercise its exclusive sovereignty. Outside these limits another State generally exercises sovereignty over land territory. In order to prevent conflicts between border States a clear delimitation of their respective territories is essential".[302]

Moving onto state boundaries in general, first, after having a title, [303] two 'successive acts', namely 'delimitation' and 'demarcation' are necessary to fix the state boundaries. Embarking upon the 'delimitation', it is the "determination of a boundary line by treaty

[299] Art. 1 of the Convention on the Rights and Duties of States Adopted by the Seventh International Conference of American States. Signed at Montevideo, December 26th, 1933. League of Nations - Treaty Series. No. 3802.
[300] O.B. Bakhasab, 'The Legal Concept of International Boundary', *JKAU: Econ. & Adm*., Vol. 9, 1996, p. 30.
[301] Ibid. pp. 33-34.
[302] L.J. Bouchez, 'The Fixing of the Boundaries in International Boundary Rivers', *International and Comparative Law Quarterly*, Vol. 12, 1963, p. 789. Remark: In discussing the relevance of water pollution as part of the Introduction, we have stressed the relationship between water pollution and state responsibility. However, this definition draws attention to the significance of clear borders.
[303] J. Crawford, *Brownlie's Principles of Public International Law*, Oxford University Press, Oxford, 2008, p. 213.

or otherwise, and its definition in written, verbal terms".[304] Moving onto the demarcation, it is the designation of the boundary line on the ground, which can be carried out by boundary pillars, means of posts or by similar physical means.[305] However, it can happen that although a boundary is legally definitive, but remains undetermined. Nonetheless, *de facto* boundaries can "be accepted as the legal limit of sovereignty for some purposes".[306] These two 'successive acts' can by illustrated, among others, by the example of Treaty between the Federal Republic of Germany and the Republic of Poland on the confirmation of the frontier between them, which states that

"*The Contracting Parties reaffirm the frontier between them, whose course is defined in the Agreement between the Polish Republic and the German Democratic Republic concerning the demarcation of the established and existing Polish-German State frontier of 6 July 1950 and agreements concluded with a view to implementing and supplementing the Agreement (Instrument confirming the demarcation of the State frontier between Poland and Germany of 27 January 1951; Agreement between the Polish People's Republic and the German Democratic Republic regarding the delimitation of the sea areas in the Oder Bay of 22 May 1989), as well as the Agreement between the Polish People's Republic and the Federal Republic of Germany concerning the basis for normalization of their mutual relations of 7 December 1970"*.[307]

In addition, it is noteworthy that during the demarcation such kind of difficulties may arise which have not been foreseen by the delimitation.[308] This can be connected to the traditional classification of boundaries, which differentiate between 'natural' and 'artificial' boundaries. Under the so-called natural boundary, we can understand, among others, mountain crests, rivers and lakes.[309] However, when it comes to river boundaries, it can be said that although it is derived from nature, it is not a 'natural' way to separate communities. Quite the contrary, they say that "mountains divide, rivers connect", which is true for both densely and sparsely populated territories. [310] As will be seen, while introducing the different kinds of boundary lines although river boundaries are derived

[304] K. Gleditsch, 'Rivers as International Boundaries', Nordisk Tidsskrift for International Ret, Vol. 22, 1952, p. 15.
[305] Ibid.; Crawford, 2008, p. 213.
[306] Crawford, 2008, p. 213.
[307] Art. 1 of Treaty between the Federal Republic of Germany and the Republic of Poland on the confirmation of the frontier between them, signed in Warsaw on 14 November 1990.
[308] Gleditsch, 1952, p. 16.
[309] Ibid. p. 15.
[310] Ibid. p. 16.

from nature, it is far from the reality that rivers are natural and convenient dividing line between states. [311] So, it seems to be more appropriate to say that river boundaries are 'derived artificial boundaries' ('artificial boundaries properly speaking') if our presumption is that "All boundaries are artificial; some are less artificial than others".[312]

Furthermore, concerning river boundaries Sudan's reply to the ILC's questionnaire has to be mentioned that differentiated between four types of rivers, namely

"(a) A river that is wholly inside one country;

(b) A river that passes from one country to another through one border;

(c) A river that passes along the borders of two neighbouring countries (the river being the border);

(d) A river that passes through one country from point A to point B and during its course between A and B passes wholly into another neighbouring country, or winds from one country to another".[313]

In addition, it is worth noting that different kinds of territorial sovereignty concepts exist, such as absolute territorial sovereignty,[314] absolute territorial unity[315]or joint ownership;[316] however, we do not wish to deal with them as part of this research as their analysis would not contribute to our research anyhow.

[311] Ibid. p. 16.
[312] Ibid. p. 15.
[313] A/CN.4/314, Replies of Governments to the Commission's questionnaire, *Extract from the Yearbook of the International Law Commission*, 1978, Vol. II(1), p. 260. Remark: As can be seen, although this classification was presented by a State, namely Sudan; however, it encompasses generally accepted classification.
[314] Ibid., p. 255. This theory states that "every State has the full right to exercise over the portion of an international watercourse which passes through its territory all the rights deriving from its absolute sovereignty over its territory unrestrictedly and unconditionally". (…) theory is adhered to firmly only by those States within whose territory the upper reaches of an international river are located.
[315] Ibid., p. 255. Absolute territorial unity maintains that "a State through whose territory an international river runs is fully entitled to use the water flow of the river as the need arises within its territory with regard to water quantity and quality, because the whole river, from the source to the outlet, is a territorial unit which cannot be divided up by political boundaries".The sovereignty is "restricted by the obligation not to interfere with the natural course of the river, and a State may not within its territory change the course of the river or impede the flow of its water to the territory of other States within whose territory the river basin lies. A State may not increase or decrease the flow of river water by artificial means.
[316] Ibid., p. 255. This concept is based on "the principle that the whole river, from the source to the outlet, is to be regarded as the joint property of all the States through whose territory the river passes, their rights being equal and integral, and no single one of them being exclusively entitled, without the agreement of the other States",

Moving onto the boundary-lines a river may follow, first, the river bank will be discussed, followed by the middle line and the thalweg. Finally, we will shortly refer to the arbitrary line.[317]

2.7.1. River bank

Before discussing river bank as a boundary in detail, first, we have to refer to the characteristics of water once again, namely water is in constant motion and it respects no boundaries. The river bank is therefore subject to change depending on "rises and falls of water".[318] Consequently, it can be concluded that river bank is an 'imprecise' term.[319] Additionally, river banks are highly influenced not only by water quantity, but other factors such as the turbidity of the river or how curved the river is; moreover, sediments also play a role in forming river banks.[320]

Nonetheless, two cases can be mentioned to avoid the application of river bank as a border. In the first case, when "one State is strong enough to occupy both sides of the River", the river does not function as a boarder, so all the uncertainties surrounding this concept are not relevant. In the second case, when "one of the banks of a river" is defined "as a boundary line between two States, therefore, the whole river belongs to the same State".[321]

When it comes to the latter case, two categories can be distinguished. The first category can be made up those cases, "where the one State is much more powerful than the other State and the boundary line is the result of power politics". This can be illustrated by the example of Costa Rica and Nicaragua concerning San Juan River, over which Nicaragua has sovereign right, whereas Costa Rica is entitled merely to right to navigate. However, as the judgments of the ICJ illustrate this solution is far from being conflict-free.[322] In the second group of cases, "where one of the border States is not seriously interested in the boundary river". However, it cannot be overemphasised concerning this case that, on the one hand, this theory contradicts the current approach to freshwater,[323] namely freshwater is a precious resource with no alternative, so every state is interested in

[317] Gleditsch, 1952, p. 17.
[318] Ibid. p. 18.
[319] Ibid.
[320] Ibid.
[321] Ibid.
[322] Dispute regarding Navigational and Related Rights (Costa Rica v. Nicaragua), Judgment, I.C.J. Reports 2009, p. 213.; Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica) Proceedings joined with Certain Activities carried out by Nicaragua in the Border Area (Costa Rica v. Nicaragua) on 17 April 2013.
[323] Gleditsch, 1952, p. 18.; Bouchez, 1963, p. 791.

freshwater resources. On the other hand, in default of enjoying rights concerning rivers does not mean that these States would be free from the commitments relating to the protection of the rivers such as the prevention of pollution from agricultural sources or from any other activities not relating to water uses. Consequently, nowadays, it is difficult though not impossible to justify this second category.

However, the examination of the characteristics of the river bank still begs the question how it is possible to define river bank as a boundary line. As discussed before, river bank can be situated at different places depending on the water level. Further, based on the water level, high water mark and low water mark can be distinguished. While the first one is the most advantageous for the State which rules the river, whereas the second one favours the other State.[324] Consequently, it seems to be vital to clarify the water level between the States in question. However, it raises the question what happens in default of such kind of precise determination of water line. In this case, it can be argued that boundary line is the river bank at low water mark. This viewpoint can be justified by the argument that "the land which is dry at low water mark is a natural and integral part of the river bank and can therefore be best controlled from that bank".[325] In addition, it is wort noting that

"Even when a state retains its dominion over a river which constitutes the boundary between itself and another state, it would be extremely inconvenient, to extend its dominion over the land on the other side, which was left bare by the receding of the water. And this inconvenience is not less, where the rising and falling is annual, than where it is diurnal. Wherever the river is a boundary between states, it is the main, the permanent river, which constitutes that boundary; and the mind will find itself embarrassed with insurmountable difficulty, in attempting to draw any other line than the low-water mark".[326]

In addition, it was specified further that the line of low-water mark can be defined as *'"he point to which the river recedes at its lowest stage without reference to extreme droughts, and no exception has been taken to this definition".*[327]

[324] Gleditsch, 1952, p. 18.; Bouchez, 1963, p. 791.
[325] Bouchez, 1963, p. 792.
[326] Decision of May 19, 1938, of the United States Supreme Court in the case of *State of Vermont* v. *State of New Hampshire.*
[327] Ibid.

2.7.2. Middle line or median line

The application of middle line or median line as a border line may date back to the Italian City States and it was the usual way to divide rivers in treaties before the 19th century if it was specified at all.[328] The middle line or median line "involves every point on the line being equidistant from the nearest point or points on opposite shores of the lake, river or strait". [329] Using the middle line as a border line, therefore, "gives a sort of primitive justice to the two States by dividing the visible water surface in two equal parts".

Nonetheless, this kind of allocation provides only seemingly equal allocation of water (so-called 'primitive justice'), which can be traced back to two main reasons. Firstly, it can be argued that river beds as well as river banks vary depending on several factors such as bends in the river, the velocity of the currents and whether the river bed make up of hard rock, clay or sand as these factors can result in very different water depth between the two banks. Consequently, by dividing the visible water surface into two equal part, the allocated water quantity will be in the vast majority of the cases not equal at all. Secondly, besides the unfair allocation of the available water quantity, this method can trigger such kind of situations when one State controls the whole navigable channel, whereas the other riparian State has to content itself with broad band of useless shallow waters or even sand banks.[330]

To top it all, "in spite of its apparent simplicity, is not an easily recognizable line". As was the case with river bank, middle line has the disadvantage of varying with the water level, which results in constant alteration in the position of the median line; however, it is in sharp contrast with the expectation towards modern state borders. In order to challenge this uncertainty, it is common to define it by determining a water stage such as high water, low water or any other intended state of water.[331] In case of tidal rivers, it is especially desirable to determine the middle line at "half way between the low-water marks of ordinary tides on each side of the river may be taken as a basis".[332] Nonetheless, even if it is possible to carry out the visible middle line between the banks, it will probably not coincide with it in most seasons. [333] Because of these factors, not surprisingly, its

[328] Gleditsch, 1952, p. 18.
[329] Bouchez, 1963, p. 792.
[330] Gleditsch, 1952, p. 18.
[331] Ibid. p.18.; A.O. Cukwurah, *The Settlement of Boundary Disputes in International Law,* Manchester University Press, Manchester, 1967, pp. 50-51.
[332] Ibid. p. 51.
[333] Gleditsch, 1952, p. 18.; Cukwurah, 1967, pp. 50-51.

application was mostly limited to non-navigable rivers and lakes, as in these cases, its weaknesses do not bear with much relevance.

2.7.3. Thalweg

The thalweg is the *"course frequently, if not, commonly, corresponds with the deepest channel. It may, however, for special reasons take a different path"*.[334] There is a special reason behind opting for thalweg as a boundary, namely navigation as *"It has long been agreed when a navigable river forms the boundary between two states, the dividing line follows the thalweg of the stream"*. [335] Although the Treaty of Luneville (1801) concerning Rhine is often referred as a classic example of thalweg, it had been known and applied much earlier even if this terminology was not always used or it was used without being precisely defined what has to be understand under this term.[336]

Before being further involved in the analysis of thalweg, it is vital to differentiate between two terms, namely 'thalweg' and 'channel', which will clarify the meaning as well as the origin of thalweg. Embarking upon the term channel, it has a French origin and it is "obviously derived from the existence in many rivers of a restricted deeper channel which is the safe road for navigation".[337] Moving onto the word thalweg, it is a derivation of a German term being accepted both in English and French, which indicates "*way downwards, or the course followed by vessels of largest tonnage in descending the river"*,[338] in other words, "the channel continuously used for navigation". [339] As can be seen, both terms share common roots relating to safe road for navigation. Moreover, it is generally understood that while both thalweg and channel are a boundary area in theory, thalweg can be defined in practice "not as a channel of some width, but as a line"[340] that is desirable in order to meet the modern expectations relating to precise borders. This approach can be detected by the US Supreme Court that recognises 'doctrine of thalweg' by stipulating relating to navigable boundary rivers the line follows the "middle of the main channel of the stream".[341] Consequently, as can be seen, tough these terms definitely overlap each other, as we will see that is incorrect to use them as synonymous.

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[334] C.C. Hyde, 'Notes on Rivers as Boundaries', *American Journal of International Law*, Vol. 6, 1912, p. 903.
[335] Ibid. p. 902
[336] Gleditsch, 1952, p. 20.
[337] Ibid.
[338] Hyde, 1912, pp. 902-903.
[339] Bouchez, 1963, p. 793.
[340] Gleditsch, 1952, p. 20.
[341] Hyde, 1912, p. 903.

Thalweg as a boundary line has two obvious advantages compared with the middle line or the river bank. First, it gives both States equal access to the navigable channel. This may be crucial not only concerning navigation but also in other respects such as fishery. Second, it is "*to all extents and purposes independent of the rises and falls of waters, in fact it is the only possible line derived from nature in a river which is the same at all water stages*". However, this characteristic cannot suggest that it would be an 'unchanging line'. Normally, this could be a reason against applying thalweg; however, on the one hand, we should refer to the advantage provided by guaranteeing freedom of navigation for both riparian States. On the other hand, the disadvantage of the thalweg can be remedied by defining thalweg "*as a line, not as a channel, and as a unique line, the position of which is above doubt at least theoretically"*.[342] As argued by de la Pradelle, if thalweg can be fixed as a boundary line "by defining the thalweg as the line of deepest soundings at low water level of the river".[343] However, this approach is not completely correct, as "the line of the succeeding deepest soundings is a better definition in order to ensure that decisive importance is not attached to accidentally formed deep places in the river". Furthermore, it can be questioned whether it is justified to fix such a precise boundary line in case of navigable rivers. If we limit this question to navigable rivers concerning navigation, it can be accepted that argumentation that

"From the practical point of view the thalweg as a boundary area (the channel of the river) is more desirable, as a ship in using the channel will never navigate without interruption on the one side of the boundary[344] line. On the contrary, ships will nearly always navigate at the same time partly on the one side and partly on the other side of the precise boundary line".[345]

However, we cannot ignore that even in case of navigable rivers, navigation is merely one function of the river with which other uses can and do compete; consequently, a precise border line bear with significance concerning water uses other than navigation, especially relating to state responsibility.

In comparing middle line with thalweg, we can shortly summarize the main differences in the following way. First, thalweg aims to adopt the same principle as the middle line in terms of guaranteeing equal rights to the riparian States, nonetheless, in case of thalweg

[342] Gleditsch, 1952, p. 20.
[343] Bouchez, 1963, p. 793.
[344] Bouchez, 1963, p. 793.
[345] Ibid. p. 794.

equal rights are related to freedom of navigation for both riparian States. Second, thalweg is more stable, though not unchangeable line compared to median line which is continuously changing with the water level if it is not fixed. Third, thalweg is much rather a boundary area by its nature than a boundary line just like middle line. Finally, though middle line is not easily visible, but generally it is easy to fix it, whereas the determination of thalweg can run into difficulties as sometimes it is "difficult to find the continuation of the original thalweg when the channel splits up in two or more branches".[346] When it comes to determining the natural continuation of the channel concerning the thalweg, several factors have to be taken into account such as "the amount of water in the stream, the rapidity of the stream and even the stream which is followed by fish".[347] In addition, thalweg as a boundary line can be the subject of 'gradual and imperceptible changes' thanks to accretion or erosion. In these cases, "If the change is perceptible and sudden, the boundary continues to follow the line indicated by the previous channel." This is true whether the river leaving its former bed thereby makes for itself a new course, or simply alters by enlargement or otherwise the path of the principal channel".[348]

2.7.4. Arbitrary line

After our discussion concerning thalweg, another boundary line will be shortly discussed, namely arbitrary line. We have to note relating to it that this method ignores the natural properties of rivers and it fixes the boundary by arbitrary straight lines.[349] However, as we have discussed the characteristics of rivers and the way they affect the boundary between states, we can raise the question why arbitrary lines should be favoured compared to other methods. Although the stability provide by this method cannot be questioned, apart from that, it would be difficult to find any other argument to support its application, even if we talk about "broad lakes, river estuaries and stretches of broad and straight rivers and in general for rivers which are comparatively stable," as indicated by Gleditsch.[350] In addition, if we recall the aims of the middle line and the thalweg in term of creating equality between the two states, we can easily recognise that this method does not wish to represent anything similar. Quite the contrary, it can deprive one state of enjoying right to navigation or it can result in an unfair allocation of water in terms of

[346] Ibid. p. 794.
[347] Ibid. p. 795.
[348] Hyde, 1912, pp. 904-905.
[349] Bouchez, 1963, p. 796.
[350] Ibid. p. 796.

quantity or usefulness. Moreover, despite its stability the disadvantages of this concept can be accelerated once the river changes its position.[351]

[351] Gleditsch, 1952, p. 21.

3. Provisions Concerning Water Pollution in the Watercourses Convention and in the Water Convention[352]

A unique situation characterized by McCaffrey as "unprecedented in the annals of international law"[353] has emerged, namely two multilateral treaties covering the same subject matter, the Water Convention[354] and the Watercourses Convention[355] entered into force.[356] Not surprisingly, scholars devoted considerable attention to the analysis of their provisions[357] in order to find out to what extent the two Conventions coincide.[358] The current chapter seeks to contribute to these analyses by focusing on the provisions relating to water pollution. In the beginning we will put the emphasis on general, but unavoidable topics such as the adoption of the two Conventions or the establishment of the UNECE. This will bring us to compare the two Conventions based on certain characteristics such as their framework character, their geographical scope, not to mention the traditional differentiation between the 'economic cast' of the Watercourses Convention compared to the environmental approach of the Water Convention. Then, we will start our examination with the Watercourses Convention, followed by the Water Convention. Regarding the two Conventions we attempt to examine them in line with similar considerations. When it comes to the Watercourses Convention, we will start with Article 20 on Protection and

[352] Remark: This chapter was based on Á. Bujdos, The 'hidden' definition of water pollution in the UNECE Water Convention *in* M. Szabó, R. Varga & P.L. Láncos (Eds.), *Hungarian Yearbook of International Law and European Law 2016*, Eleven International Publishing, Hague, 2017, pp. 163-184. and Á. Bujdos, The UN Watercourses Convention, with special regard to the environmental provisions, *in* M. Szabó, R. Varga & P.L. Láncos (Eds.), *Hungarian Yearbook of International Law and European Law 2015*, Eleven Publishing, The Hague, 2016, pp. 151-165.

[353] S.C. McCaffrey, The 1997 UN Convention: Compatibility and Complementarity, *in* Tanzi *et al.* (Eds.), *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes: its contribution to international water cooperation*, Brill Nijhoff, Leiden, Boston, 2015, p. 51.

[354] Convention on the Protection and Use of Transboundary Watercourses and International Lakes, adopted on 17 March 1992 in Helsinki and entered into force on 6 October 1996.

[355] Convention on the Law of the Non-Navigational Uses of International Watercourses, adopted on 21 May 1997 in New York and entered into force on 17 August 2014.

[356] See; A. Tanzi, *The Economic Commission for Europe Water Convention and the United Nations Watercourses Convention An analysis of their harmonized contribution to international water law*, Water Series № 6, United Nations, New York, Geneva, 2015, p. 3.

[357] See; A. Tanzi, *The Relationship between the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses*, Report of the UN/ECE Task Force on Legal and Administrative Aspects, Geneva, 2000.; A. Tanzi, 'Comparing the 1992 UNECE Helsinki Water Convention with the 1997 UN New York Convention on international watercourse: harmonization over conflict', *Questions of International Law*, Vol. 8, 2014, pp. 19-33.; A. Rieu-Clarke, 'A cure or a curse? Entry into force of the UN Watercourses Convention and the Global Opening of the UNECE Water Convention', *Questions of International Law*, Vol. 8, 2014, pp. 3-17.

[358] See: Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law, Report of the Study Group of the International Law Commission, A/CN.4/L.682, 2006. para. 37.

preservation of the ecosystem, followed by Article 21 on Prevention, reduction and control of pollution. First, Article 21(1) regarding the 'pollution of the international watercourse' will be analysed. Then, we will examine Article 21(2) relating to the obligations to prevent, reduce and control the pollution of an international watercourse. Moving onto the Water Convention, on the one hand, we have identified that we do not have the primary resources, namely the preparatory documents. On the other hand, the Water Convention does not define the term pollution. These circumstances affect both the length and the deepness of our research. Consequently, first, the provisions relating to the ecosystem will be discussed, followed by the concept of 'transboundary impact'. Then, we wish to collect all the references relating to water pollution as well as to the obligations to prevent, reduce and control in the Water Convention. Finally, the relationship between the Water Convention and the other UNECE environmental conventions will be explained.

3.1. The Adoption of the Watercourses Convention and the Water Convention

In the vein of the analytical scheme of this chapter, when presenting the adoption of the two Conventions, we will embark upon the enquiry of the Watercourses Convention. This is justified, on the one hand, by the fact that, contrary to the case of the Water Convention, the International Law Commission (ILC) provides us with a rich source of preparatory documents covering a wide range of sources,[359] not to mention the Draft articles on the law of the non-navigational uses of international watercourses (Commentary of the Watercourses Convention) adopted in 1994,[360] which function as a commentary to the Watercourses Convention. On the other hand, as mentioned before, the definition of water pollution, a core element of this analysis, can only be found in the Watercourses Convention; therefore, it is reasonable to take this document as a starting point.

[359] E.g. national law, bilateral and multilateral agreements; declarations and resolutions of international organisations, such as the Institute of International Law, the Inter-American Bar Association and International Law Association, and decisions of international tribunals. A/CN.4/274, *Yearbook of the International Law Commission*, 1974, Vol. I(2).; A/5409, *Yearbook of the International Law Commission*, 1974, Vol. II, Part Two.;

[360] Draft articles on the law of the non-navigational uses of international watercourses and commentaries thereto and resolution on transboundary confined groundwater, adopted by the International Law Commission at its forty-sixth session in 1994, *Yearbook of the International Law Commission*, 1994, Vol. II, Part Two, pp. 89-135.

3.1.1. The Adoption of the Watercourses Convention

The ILC started its work on the Watercourses Convention after the General Assembly (GA) adopted its Resolution on Progressive development and codification of the rules of international law relating to international watercourses in 1970, in which the ILC was called upon "to take up the study of the law of the non-navigational uses of international watercourses with a view to its progressive development and codification",[361] however, subsequently in the Commentary of the Watercourses Convention the ILC did not indicate whether certain provisions formed the 'codification' or the 'progressive development' of international law.[362]

The Watercourses Convention was negotiated in the Sixth (Legal) Committee of the GA, based on the draft articles of the ILC. The negotiations were open to all member states of the United Nations. The ILC's work was highly influenced by the different approaches represented by its five special rapporteurs and was therefore not 'linear'.[363] Firstly, it developed on the basis of the annual interaction between the ILC and the GA.[364] Secondly, at various stages of the ILC's work, states also had the opportunity to reflect on the drafts and share their viewpoint.[365]

On 21 May 1997, the Watercourses Convention was eventually adopted by an overwhelming majority of the states, as 103 states voted in favour, 26 abstained, and only three states (Burundi, China and Turkey) voted against it.[366] Contrary to this remarkable support, ratification progressed rather slowly, although the Watercourses Convention

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[361] GA Res. 2669 (XXV), 8 December 1970. However, it has to be supplemented with the following remark concerning the relationship between navigational and non-navigational uses: "Navigation requirements affect the quantity and quality of water available for other uses. Navigation may and often does pollute watercourses, and requires that certain levels of water be maintained; it further requires passages through and around barriers in the watercourse. The interrelationships between navigational and non-navigational uses of watercourses are so many that, on any watercourse where navigation is practised or is to be instituted, navigational requirements and effects and the requirements and effects of other water projects cannot be separated by the engineers and administrators entrusted with development of the watercourse. This fact suggests that the Commission cannot wholly exclude navigational uses from the scope of its draft. Article 1 has been drafted accordingly". See: A/CN.4/320, First Report on the law of the non-navigational uses of international watercourses, by Mr. Stephen Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1979, Vol. II(1), para. 61. On the interaction between the navigational and non-navigational use see more: A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 431-451.

[362] S.C. McCaffrey, 'The 1997 U.N. Watercourses Convention: Retrospects and Prospects', *Global Business & Development Law Journal*, Vol. 21, 2008, p. 165.

[363] Ibid.

[364] Ibid.

[365] A. Rieu-Clarke & K. Hayward, 'Entry into force of the 1997 UN Watercourses Convention: barriers, benefits and prospects', *Water 21*, Vol. 9, No. 6, 2007, p. 12.

[366] GA Fifty-first Session 99th plenary meeting Wednesday, 21 May 1997, 10 a.m., New York.

required merely 35 instruments of ratification or accession to enter into force,[367] which is slightly less than one third of the states that voted in favour of the final draft. It finally entered into force on 17 August 2014.[368]

To date, there are 36 contracting states to the Watercourses Convention.[369]

As far as the Watercourses Convention's structure is concerned, it is divided into seven parts and contains 37 articles. It encompasses both substantive and procedural provisions; the most significant articles are located in Part II on General Principles, Part III on Planned Measures, Part IV on Protection, Preservation and Management and Part V on Harmful Conditions and Emergency Situations.

3.1.2. Current Status of the Watercourses Convention

As stated earlier, to date there are 36 contracting states to the Watercourses Convention.[370] Despite the long ratification process and the low number of the parties, the significance of the Watercourses Convention is indisputable. This ascertainment can be supported, first and foremost, by the judgement of the International Court of Justice (ICJ) in the case Gabčikovo-Nagymaros,[371] in which ICJ referred to the Watercourses Convention several times shortly after its adoption.[372]

Moreover, it seems to be influential in regional, basin specific and bilateral agreements, especially in Africa such as Revised Protocol on Shared Watercourses in the Southern African Development Community in 2000.[373]

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[367] Art. 36 of the Watercourses Convention.

[368] https://treaties.un.org/Pages/ViewDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=XXVII-12&chapter=27&lang=en#Participants

[369] Such as, Benin, Burkina Faso, Chad, Côte d'Ivoire, Denmark, Finland, France, Germany, Greece, Guinea-Bissau, Hungary, Iraq, Ireland, Italy, Jordan, Lebanon, Libya, Luxembourg, Montenegro, Morocco, Namibia, Netherlands, Niger, Nigeria, Norway, Portugal, Qatar, South Africa, Spain, State of Palestine, Sweden, Syrian Arab Republic, Tunisia, United Kingdom of Great Britain and Northern Ireland, Uzbekistan, Vietnam. https://treaties.un.org/Pages/ViewDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=XXVII-12&chapter=27&lang=en#EndDec.

[370] Such as Benin, Burkina Faso, Chad, Côte d'Ivoire, Denmark, Finland, France, Germany, Greece, Guinea-Bissau, Hungary, Iraq, Ireland, Italy, Jordan, Lebanon, Libya, Luxembourg, Montenegro, Morocco, Namibia, Netherlands, Niger, Nigeria, Norway, Portugal, Qatar, South Africa, Spain, State of Palestine, Sweden, Syrian Arab Republic, Tunisia, United Kingdom of Great Britain and Northern Ireland, Uzbekistan, Vietnam. https://treaties.un.org/Pages/ViewDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=XXVII-12&chapter=27&lang=en#EndDec.

[371] Case Concerning the Gabčikovo-Nagymaros Project (*Hungary/Slovakia*), Judgment of 25 September 1997, Judgment, 1997 ICJ Rep., p. 7.

[372] McCaffrey, 2001, p. 259.

[373] Rieu-Clarke & K. Hayward, 2007, p. 14.

However, Biswas warned that the impact of the Convention on the resolution of conflicts may be limited, as several states belonging to the same international watercourses and having ongoing disputes did not support the adoption of the Watercourses Convention.[374] This observation begs the question to what extent the Watercourses Convention reflects customary international law. As mentioned above, when the ILC was asked in 1970 to study the non-navigational use of international watercourses, the GA referred in its Resolution to both 'progressive development and codification' of international law.[375] However, as McCaffrey correctly observed, the ILC did not indicate in the Commentary of the Watercourses Convention whether certain provisions were the codification or the progressive development of international law. Nonetheless, in his opinion, at least three principles constitute part of the customary international law such as the equitable and reasonable utilization, the obligation not to cause significant harm and the obligation to notify.[376] In addition, Salman extended this list with the exchange of data and information, and the provisions relating to the protection of the environment.[377] Differentiating between customary international law and the other provisions of the Watercourses Convention is crucial, as customary international law norms bind all states regardless of joining the Convention, while other rules binds only the party to the Convention.[378] Bruhács argued that the whole Convention reflects the customary law on governing the non-navigational uses of international watercourses, as it transforms customary rules into treaty provisions as a codification treaty. Furthermore, it was referred to by the ICJ in the Gabčikovo-Nagymaros case before its entry into force.[379]

However, several reasons may be recalled which contradict this approach. First, the controversies, which have surrounded certain provisions, first and foremost, the relationship between the principle of equitable and reasonable utilization and the principle not to cause significant harm, as upper riparians tend to favour the former one, while lower riparians the latter one.[380]

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[374] J.C. Kahn, '1997 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses', *Colorado Journal of International Environmental Law and Policy*, 1997 Yearbook, p. 183.
[375] McCaffrey, 2001, p. 259.
[376] McCaffrey, 1997, p. 27.
[377] Salman, 2007, p. 13.
[378] Art. 38 of the Statute of the International Court of Justice..
[379] J. Bruhács, 'A nemzetközi folyók jogáról szóló 1997.évi New York-i egyezmény', *Jura*, Vol. 6. No. 1-2, 2000, p. 46.
[380] A. Schwabach, 'The United Nations Convention on the Law of the Non-navigational Uses of International Watercourses, Customary International Law, and the Interests of Developing Upper Riparians', *Texas International Law Journal*, Vol. 33. No. 2, 1998, pp. 276-278; C.B. Bourne,' The Primacy of the Principle of Equitable Utilization in the 1997 Watercourses Convention', Canadian Yearbook of

Secondly, despite its entry into force, the slow ratification process as well as the low intention to join may indicate that the Convention does not unconditionally mirror the standpoint of the states. This concern was also manifested in Rieu-Clarke's ascertainment, as he argued that, among others, the benefit of the Watercourses Convention's entry into force would be, on the one hand, the strong manifestation of the states towards 'water crisis'; on the other hand, the accession to the Watercourses Convention by a large number of states could contribute to the clarification and the strengthening of customary international law in this field.[381]

3.2. The Establishment of the UNECE and the Adoption of the Water Convention

Before describing the adoption of the Water Convention, the establishment of the United Nations Economic Commission for Europe (UNECE) will be briefly discussed to highlight its main goals as well as its relationship to the UN. In discussing the adoption of the Water Convention, contrary to the Watercourses Convention, besides the adoption process itself, special attention will be paid to the provisions on water quality, since in lack of a definition of water pollution these provisions may contribute to a better understanding of the meaning of pollution in the Water Convention.

3.2.1. The Establishment of the UNECE

The UNECE was set up on 28 March 1947 by the United Nations Economic and Social Council (ECOSOC)[382] and constitutes one of the five regional commissions of the UN.[383] At the outset, it focused, first and foremost, on the 'economic reconstruction' of post-war Europe, on the improvement of the 'economic activity' as well as on maintaining and

International Law, Vol. 35, 1997, pp. 215-232; M.S. Helal, 'Convention on the Law of the Non-Navigational Uses of International Watercourses Ten Years On', *Colorado Journal of International Environmental Law and Policy*, Vol. 18. No. 2, 2007, pp. 337-378.

[381] Rieu-Clarke & Hayward, 2007, p. 14. Remark: As can be seen, these comments were made before the entry into force of the Watercourses Convention.

[382] 36 (IV). Economic Commission for Europe, Resolution of 28 March 1947 (document E/402). On the Terms of Reference and Rules of Procedure of the Economic Commission for Europe see; E/ECE/778/Rev.5.

[383] http://www.unece.org/mission.html Other regional commissions are the Economic Commission for Africa (ECA), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Economic Commission for Latin America and the Caribbean (ECLAC) and the Economic and Social Commission for Western Asia (ESCWA).

strengthening the economic relationships both among the European countries, as well as these countries and the rest of the world.[384]

However, following the Cold War its focus shifted, on the one hand, to transition from a centrally planned economy system to market economy and, on the other hand, to the integration of 'countries in transition' into the global economy.[385]

Nowadays, UNECE contributes to the enhancement of the UN's effectiveness through the regional implementation of the outcomes of global UN Conferences and Summits,[386] among others, the Sustainable Development Goals.[387]

To date, UNECE has 56 Member States from both inside and outside of Europe,[388] as all countries that participated in the reconstruction of post-war Europe were included in the UNECE.[389]

3.2.2. The Adoption of the Water Convention

During a conference in 1956, the UNECE started concentrating on water pollution from urban and industrial sources, resulting in the establishment of the UNECE Committee on Water Problems by the 1960s.[390] In the next decades a series of UNECE recommendations, declarations and decisions were adopted relating to both water quantity[391] and quality;[392] these early efforts definitely paved the way for the later Water Convention.

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[384] 36 (IV). Economic Commission for Europe, Resolution of 28 March 1947 (document E/402) A. 1. a).
[385] http://www.unece.org/oes/history/history.html
[386] http://www.unece.org/oes/nutshell/mandate_role.html
[387] http://www.unece.org/info/about-unece/mission/unece-and-the-global-goals.html
[388] See; Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America and Uzbekistan. http://www.unece.org/oes/member_countries/member_countries.html
[389] http://www.unece.org/oes/nutshell/region.html
[390] A. Rieu-Clarke, Remark on the Drafting History of the Convention, *in* Tanzi et al. (Eds.), *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes: its contribution to international water cooperation*, Brill Nijhoff, Leiden, Boston, 2015, p. 4.
[391] See, e.g.; Recommendations to ECE Governments on Rational Utilization of Water (December 1979); ECE Declaration of Policy on the Rational Use of Water (December 1984).
[392] See, e.g.; UNECE Declaration of Policy on Water Pollution Control (29 April 1966); ECE Declaration of Policy on Prevention and Control of Water Pollution, including Transboundary Pollution (December 1980).

The Conference on Security and Co-operation in Europe which took place in Sofia between 16 October and 3 November 1989, is undeniably a key element regarding the Water Convention, as the participating States agreed on the necessity to "define the principles for sustainable use of transboundary waters and international lakes as well as to elaborate arrangements to protect them from pollution" during this conference.[393] As a result, the participating States recommended the UNECE to elaborate a framework convention on this issue, taking into account existing bilateral and multilateral agreements and ongoing activities, as well as the work of other organizations such as the ECE Senior Advisers on Environmental and Water Problems and the ILC.[394] Furthermore, it was suggested that the convention should include, on the one hand, basic principles such as the prevention and reduction of pollution; while, on the other hand, "principles related to commissions and to other forms of co-operation" including, among others, the identification of priority uses of waters as well as the exchange of information on significant discharges.[395]

Senior Advisers to ECE Governments on Environmental and Water Problems discussed the outcome of the Sofia meeting at their third session from 26 February to 2 March 1990 and emphasized the urgency of elaborating a framework convention, proposing that negotiations should be initiated without delay.[396] As a result, five special sessions of the Working Party on Water Problems took place between May 1990 and October 1991,[397] attended by the representatives of 25 states as well as several international organizations,[398] with the aim to elaborate the draft Water Convention.[399]

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[393] Report on Conclusion and Recommendations of the Meeting on the Protection of the Environment of the Conference on Security and Co-operation in Europe, Sofia 1989-Vienna, 1990, p. 6.
[394] Ibid.
[395] Ibid. p. 7.
[396] Rieu-Clarke, 2015, pp. 6-7.
[397] UNECE, 'Senior Advisers to ECE Governments on Environmental and Water Problems, Working Party on Water Problems – Report of the First Special Session' (17 May 1990) ECE/ENVWA/WP.3/7.; UNECE, 'Senior Advisers to ECE Governments on Environmental and Water Problems, Working Party on Water Problems – Report of the Second Special Session' (15 November 1990) ECE/ENVWA/WP.3/10.; UNECE, 'Senior Advisers to ECE Governments on Environmental and Water Problems, Working Party on Water Problems – Report of the Third Special Session' (18 January 1991) ECE/ENVWA/WP.3/13.; UNECE, 'Senior Advisers to ECE Governments on Environmental and Water Problems, Working Party on Water Problems – Report of the Fourth Special Session' (16 May 1991) ECE/ENVWA/WP.3/15.; UNECE, 'Senior Advisers to ECE Governments on Environmental and Water Problems, Working Party on Water Problems – Report of the Fifth Special Session' (8 November 1991) ECE/ENVWA/WP.3/7.
[398] Rieu-Clarke, 2015, p. 7.
[399] UNECE Draft Convention on the Protection and Use of Transboundary Watercourses and International Lakes ECE/ENVWA/WP.3/R.17.; UNECE Second Draft Convention on the Protection and Use of Transboundary Watercourses and International Lakes (21 May 1991) ECE/ENVWA/WP.3/R.19./Rev.1.1.; Amendments to the Draft Convention on the Protection of the and Use of International Watercourses and Lakes ECE/ENVWA/WP.3/19.

Finally, the Convention on the Protection and Use of Transboundary Watercourses and International Lakes was adopted in Helsinki on 17 March 1992, around the time the Soviet Union was dissolved and "new frontiers cut through Europe".[400] In this context the Water Convention represented a "piece of international legislation" on the protection and management of transboundary waters concerning the regulation of those waters that were earlier under national control.[401] As such, it exerted a strong influence on existing national law[402] as well as on bilateral and multilateral treaties.[403]

The Water Convention entered into force roughly two years following its adoption on 6 October 1996. At the time of its adoption, it was solely open to the member states of the UNECE and the regional economic integration organizations formed by these states. However, in 2003 the Meeting of the Parties adopted a decision, which allowed all UN Member States to accede to the Water Convention.[404] Furthermore, in 2012, another decision was adopted, allowing for accession by non-UNECE countries,[405] consequently, the Water Convention became a universal instrument.

As far as the structure of the Convention is concerned, it is divided into three parts and consists of 28 articles as well as four annexes. Similarly to the Watercourses Convention, the Water Convention also encompasses both substantive and procedural provisions, and the most significant of these can be identified in Part I on Provisions Relating to All Parties, in Part II on Provisions Relating to Riparian Parties and Part III on Institutional and Financial Provisions.

Following the adoption of the Water Convention, the UNECE sought to respond to new challenges relating to water, which lead to the adoption of two legally binding protocols,

[400] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, p. 1.

[401] Ibid.

[402] Ibid. On the ratification and implementation of the Water Convention in Finland see; ECE/MP.WAT/39, p. 8.

[403] See, e.g. the preamble of Convention on the Protection of the Rhine, signed on 22 January1998 in Rotterdam; the preamble of the Convention on Cooperation for the Protection and Sustainable use of the Danube River (Danube River Protection Convention), signed on 29 June 1994 in Sofia.

[404] On 28 November 2003, the Meeting of the Parties to the Convention adopted Dec. III/1, amending Arts. 25 and 26 of the Convention to allow all United Nations Member States to accede to the Convention. These amendments entered into force on 6 February 2013.

[405] On 30 November 2012, the Meeting of the Parties adopted Dec. VI/3 on accession by non- United Nations Economic Commission for Europe countries.

namely the Protocol on Water and Health[406] and the Protocol on Civil Liability.[407] Although the significance of these protocols is unquestionable, the major contribution of the UNECE to the protection of water can be attributed to the adoption of the numerous non-binding instruments such as guidelines, recommendations and model provisions.[408] To date, there are 40 parties to the Water Convention,[409] moreover, several countries outside Europe have expressed their interest in it,[410] and Iraq has also confirmed its intention to accede to the Convention.[411]

3.3. The Relationship between the Watercourses Convention and the Water Convention

In examining the relationship between the two Conventions, first, their framework character will be introduced, followed by their geographic scope. Finally, the economic as well as the environmental approach of the Conventions will be discussed.

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[406] Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, done in London, on 17 June 1999. See further: F. Bernardini, 'A Modern Approach to Water Management: The Unece Protocol on Water and Health', *Law, Environment and Development Journal*, Vol. 3, No. 2, 2007, pp. 234-243.; A. Tanzi, 'Reducing the Gap between International Water Law and Human Rights Law: The UNECE Protocol on Water and Health', *International Community Law Review*, Vol. 12, No. 3, 2010, pp. 267-286.; S. Negri, 'Waterborne Disease Surveillance: The Case for a Closer Interaction between the UNECE Protocol on Water and Health and the International Health Regulations (2005)', *International Community Law Review*, Vol. 12, No. 3, 2010, pp. 287-302.

[407] Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and to the 1992 Convention on the Transboundary Effects of Industrial Accidents, adopted on 21 May 2003, not yet in force. https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-16&chapter=27&lang=en

[408] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 57.

[409] The Contracting Parties are: Albania, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Montenegro, Netherlands, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, Ukraine and Uzbekistan. https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-5&chapter=27&lang=en.

[410] See, e.g.; Algeria, Chad, Côte d'Ivoire, the Democratic Republic of Congo, Iraq, Mongolia and Tunisia. http://www.unece.org/info/media/news/environment/2015/new-countries-from-outside-the-unece-region-express-interest-in-the-water-convention/new-countries-from-outside-the-unece-region-express-interest-in-the-water-convention.html

[411] http://www.unece.org/info/media/news/environment/2016/iraq-confirms-progress-towards-accession-to-the-unece-water-convention-in-2016/doc.html

3.3.1. The Framework Character of the Conventions

The most general trait of the Conventions is their framework character, in other words, they are both 'umbrella treaties'.[412] The framework convention as a regulatory technique can be considered to be a relatively recent phenomenon in international law, it can be mainly found in the field of international environmental law[413] such as the global environmental agreements,[414] the United Nations Environment Programme (UNEP), the Regional Seas Conventions[415] and the majority of the UNECE conventions.[416]

It is worth noting that framework conventions are also legally binding sources of international law, which do not differ from other conventions in their legal nature, thus, qualification as a framework convention does not strip these legal instruments off their binding character under the law of the treaties.[417] There was broad support for this concept in the Watercourses Convention which would

"set out general, residual principles of law of the non-navigational uses of international watercourses", and would be supplemented by "user" or "system" agreements in which the States of a particular watercourse would provide for the detailed arrangements, rights and obligations governing the uses of the watercourse in question".[418]

Concerning the framework character of the Watercourses Convention,

"The representative of Spain "agreed with the view of the Special Rapporteur that what was needed was a set of articles laying down principles regarding the use of international watercourses in terms sufficiently broad to be applied to all such watercourses while at

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[412] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 54.

[413] N. Matz-Lück, 'Framework Conventions as a Regulatory Tool', *Göttingen Journal of International Law*, Vol. 1, No. 3, 2009, p. 440.

[414] See, e.g.; United Nations Framework Convention on Climate Change (UNFCCC) adopted in New York on 9 May 1992 and entered into force on 21 March 1994. To date, it has 197 Contracting Parties.

[415] See, e.g.; Framework Convention for the Protection of the Marine Environment of the Caspian Sea; Convention on the Protection of the Marine Environment of the Baltic Sea Area 1992 Helsinki Convention, Helsinki, 1992.

[416] See, e.g.; 1979 Convention on Long-range Transboundary Air Pollution (CLRTAP) signed in Geneva on 13 November 1979 and entered into force on 16 March 1983. To date, it has 51 Contracting Parties.

[417] Matz-Lück, 2009, p. 451.

[418] A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1980, Vol. II(1), para. 7. However, "The representative of Jordan (…), was concerned that the "framework convention" envisaged "should not be so general as to defeat what surely must be one of the purposes of codification, namely, uniformity of the applicable law". He stated that political reasons might debar bilateral water agreements". See: A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1980, Vol. II(1), para. 14.

the same time providing the means by which the articles could be adapted to the singular nature of an individual watercourse".[419]

In other words, in the field of transboundary waters, the application of this instrument means that the two Conventions attempt no more than to address some basic procedural and substantive rules, leaving riparian states the possibility to forge detailed agreements tailored to the specific characteristics of the watercourse in question.[420] Not surprisingly, *"A general principle relating to all uses is necessarily more abstract and its consequences less predictable than a rule tailored to deal with a particular consequence of a specific use"*.[421]

Nonetheless, the Water Convention is "more detailed than average umbrella agreements",[422] which is apparent from numerous articles (among others, the articles of Part II on Provisions Relating to Riparian Parties), from the adoption of two binding protocols as well as several non-binding guidelines and recommendations.[423]

Additionally, it is worth mentioning that the framework character of the Watercourses Convention is obvious from both its preamble and the *travaux preparatoires*. At the same time, the Water Convention is a good example for the fact that labelling an agreement in the title or in its text as a framework convention is not a 'constitutive element' of actually becoming a framework agreement as its framework character was mentioned for the first time during the conference in Sofia in 1989[424] and was finally reaffirmed in the Guide to Implementing the Water Convention.[425]

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[419] Ibid.,para. 23.

[420] S.M.A. Salman, *'The United Nations Watercourses Convention Ten Years Later: Why Has its Entry into Force Proven Difficult?*', *Water International*, Vol. 32, No 1, 2007, p. 4.; See also: United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 56.

[421] A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1980, Vol. II(1), para. 28.

[422] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 55.

[423] http://www.unece.org/env/water/publications/pub.html

[424] Report on Conclusion and Recommendations of the Meeting on the Protection of the Environment of the Conference on Security and Co-operation in Europe, Sofia 1989-Vienna, 1990, p. 6.

[425] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 54-59.

3.3.2. The Geographic Scope of the Conventions

Moving onto the question of geographic scope, the key issue is to clarify what kind of waters are covered by the Conventions. To begin with, Article 2(a) of the Watercourses Convention, it defines 'international watercourse' as "a watercourse, parts of which are situated in different states".[426] As reasoned in the Commentary of the Watercourses Convention,

"The word "situated" is not intended to imply that the water in question is static. As will appear from the definition of "watercourse" in subparagraph (b), while the channel, lake bed or aquifer containing the water is itself stationary, the water it contains is in constant motion".[427]

Some observations can be added to this ascertainment. First and foremost, river beds are not mentioned as being stationary, though these are definitely under the scope of the definition of watercourse in the Watercourses Convention. Probably, it is attributable to the fact that river beds are obviously modified by the motion of water as well as by other factors Nonetheless, less significant changes can be obviously recognized in case of the other examples, especially when it comes to channels and lake beds. In addition, when it comes to the aquifers, thanks to the slow movement of water we cannot talk about the same effect of water movement, especially that in some aquifers the groundwater is nearly static.[428]

In addition, in Article 2(b) 'watercourse' is determined *"as a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus"*. The determination of the 'international watercourse' is interesting from two perspectives. Firstly, contrary to the general presumption, it is not synonymous with 'international river'. Based on the foregoing definition of 'watercourse', it covers a broader category than rivers by encompassing both

[426] Remark: Not surprisingly, the adoption of this definition was not without debates that is why the representative of France advanced the view that "the question of defining the term 'international watercourse' must not paralyse the work of the Commission, but a solution to the problem must not be postponed for too long since it affected both the scope and the content of the process of codification". While "The representative of India stated that the definition of an international watercourse could be dealt with by the Commission at a later stage, "perhaps by incorporating it in an optional clause". See: A/CN.4/332 and Corr.1 and Add.1, Second report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1980, Vol. II(1), para. 35-36.

[427] Commentary of the Watercourses Convention, 1994, p. 90.

[428] W. Zijl, 'Scale aspects of groundwater flow and transport systems', *Hydrogeology Journal*, Vol. 7, No. 1, 1999, pp. 139-150.

surface water (such as rivers, streams and lakes) and groundwater.[429] Nonetheless, groundwater is covered by the Watercourses Convention as far as it is connected to surface water, therefore, confined groundwaters, which are not related to any surface water, are excluded from its scope.[430] In other words, as far as the different *"components are interrelated with one another, they form part of the watercourse. These components include rivers, lakes, aquifers, glaciers, reservoirs and canals. Thus, water may move from a stream into the ground under the stream bed, spreading beyond the banks of the stream, then reemerge in the stream, flow into a lake which empties into a river, be diverted into a canal and carried to a reservoir, and so on".*[431]

Though, the inclusion of the canals was not without controversies, as some argued that "the draft had been elaborated on the assumption that a "watercourse" was a natural phenomenon".[432]

Moreover, when it comes to the phrase "normally flowing into a common terminus," it is worth noting that it was supplemented by the word 'normally' compared to the previous "flowing into a common terminus" as a result of the compromise regarding the geographical scope. As explained in the Commentary of the Watercourses Convention

"Thus, for example, the fact that two different drainage basins were connected by a canal would not make them part of a single "watercourse" for the purpose of the present articles. Nor does it mean for example that the Danube and the Rhine form a single system[433] merely because, at certain times of the year, water flows from the Danube as groundwater into the Rhine via Lake Constance. As a matter of common sense and practical judgement, the Danube and the Rhine remain separate unitary wholes".

Moreover, this

"phrase as modified by the word 'normally' is intended to reflect modern hydrological knowledge as to the complexity of the movement of water as well as such specific cases

[429] S.C. McCaffrey, 'The contribution of the UN Convention on the law of the non-navigational uses of international watercourses', *International Journal* of *Global Environmental Issues*, Vol. 1, No. 3-4, 2001, pp. 251-252; Salman, 2007, p. 5.

[430] On the regulation of confined groundwater see; Draft articles on the Law of Transboundary Aquifers, adopted by the International Law Commission at its sixtieth session, in 2008. See more: G.E. Eckstein, 'Commentary on the U.N. International Law Commission's Draft Articles on the Law of Transboundary Aquifers', *Colorado Journal of International Environmental Law and Policy*, Vol. 18, No. 3, 2007, pp. 537-610.; A. Allan, F. Loures & M. Tignino, 'The Role and Relevance of the Draft Articles on the Law of Transboundary Aquifers in the European Context', *Journal for European Environmental & Planning Law*, Vol. 8, No. 3, 2011, pp. 231-251.; K. Mechlem, 'Past, Present and Future of the International Law of Transboundary Aquifers', *International Community Law Review*, Vol. 13, No. 3, 2011, pp. 209-222.

[431] Commentary of the Watercourses Convention, 1994, p. 90.

[432] Ibid.

[433] Commentary of the Watercourses Convention, 1994, p. 90.

as the Rio Grande, the Irawaddy, the Mekong and the Nile. While all the named rivers are "a system of surface and groundwaters constituting by virtue of their physical relationship a unitary whole", they flow to the sea in whole or in part via groundwater, a series of distributaries which may be as much as 300 kilometres removed from each other (deltas) or empty at certain times of the year into lakes and at other times into the sea".[434]

In addition, this interrelationship between surface water and groundwater bears relevance to both water quantity and quality, as water withdrawals mutually affect both surface and groundwater as well as the pollution in either source in turn also contaminates the other source.[435] Moreover, as mentioned earlier, based on the hydrological cycle, pollutants introduced or reaching rivers by flowing water will sooner or later reach the sea.[436] Consequently, the quality of rivers directly affects the marine environment, which also has important functions such as fishery or recreation.[437] This connection is enshrined in Article 23 on the Protection and preservation of the marine environment.

Turning our attention to Article 1(1) of the Water Convention, it defines 'transboundary waters' as

"any surface or ground waters which mark, cross or are located on boundaries between two or more States; wherever transboundary waters flow directly into the sea, these transboundary waters end at a straight line across their respective mouths between points on the low-water line of their banks".

Consequently, "surface waters include waters collecting on the ground in a stream, river, channel, lake, reservoir or wetland;" while groundwaters, contrary to the Watercourses Convention, cover both "confined and unconfined aquifers".[438] Similarly to the Watercourses Convention, though sea waters do not fall under the scope of the Water Convention, there are references to the protection of the marine environment such as the preamble stipulates the obligation to "abate [...] the pollution of the marine environment, in particular coastal areas, from-land based sources", furthermore, among the general

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[434] Ibid. p. 91.

[435] S.C. McCaffrey, The UN Convention on the Law of the Non-Navigational Uses of International Watercourses: Prospects and Pitfalls, *in S.M.A. Salman* & *L. Boisson de Chazournes* (Eds.), *International Watercourses, Enhancing Cooperation and Managing Conflict,* World Bank Technical Paper No. 414, 1997, p. 18.

[436] Boisson de Chazournes, 2013, p. 5.

[437] *Protecting coastal and marine environments from land-based activities: A guide for national action* UNEP, 2006, p. 2.; D. Shelton & A. Kiss, *Judicial handbook on Environmental Law,* UNEP, Stevenage, 2005, p. 65.

[438] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 73.

provisions one can also find reference not only to the "protection of the environment of transboundary waters", but also to the "environment influenced by such waters, including the marine environment".[439] Yet it follows from the same paragraph that

"transboundary waters should not be limited to a water body [...], but should cover the catchment area of the said water body (or in case of an aquifer, whether confined or unconfined, its entire recharge area). The entire catchment area of a surface water body or a recharge area of the aquifer should be understood as the area receiving the waters from rain or snow melt, which drain downhill [...] into a surface water body or which infiltrate through the subsoil [...] into the aquifer".[440]

Finally, the Water Convention covers transboundary waters which end in a desert sink or in an enclosed lake.[441]

3.3.3. The 'Economic Cast' *vs.* the Environmental Approach

Lastly, in comparing the two Conventions, it is common to refer to the 'economic cast' of the Watercourses Convention as opposed to the environmental approach of the Water Convention,[442] though "these qualities are not contradictory but rather complementary in nature".[443] One can observe that this notion of interdependence between the economy and the environment forms the basis of the principle of sustainable development,[444] which is one of the guiding principles underlying both Conventions. Furthermore, as mentioned above concerning the establishment of the UNECE; UNECE plays a key role in the regional implementation of the UN's goals; consequently, they share the same roots and principles which can be detected, among others, in the reference to the UN Conference on Environment and Development of 1992, the Rio Declaration and Agenda 21 in the preamble of both Conventions. Finally, the aforementioned interrelationship can be

[439] Art. 2(6) of the Water Convention.

[440] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 74.

[441] Ibid., para. 78.

[442] Tanzi, 2015, p. 4.

[443] The Relationship between the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 25 February 1991) and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 17 March 1992), p. 3. https://www.unece.org/fileadmin/DAM/env/eia/documents/links_between_conventions/linktranswatersandeiaconventions.pdf

[444] Report of the World Commission on Environment and Development: Our Common Future,1987. http://www.un-documents.net/our-common-future.pdf ; See, also; G. Bartus & Á. Szalai, *Környezet, jog, gazdaságtan: környezetpolitikai eszközök, környezet-gazdaságtani modellek és joggazdaságtani magyarázatok,* (Jogtudományi Monográfiák 6.), PÁZMÁNY PRESS, Budapest, 2014, pp. 25-30.; Perman, 2003, pp. 17-28. See, generally; Hildering, 2004.; Perman, 2003, pp. 16-52.

backed up by several facts. On the one hand, numerous environmental provisions were enshrined in the Watercourses Conventions, especially in Part IV on Protection, Preservation and Management, though its title refers only to the 'uses' without any reference to the protection of international watercourses. Furthermore, although the UNECE was established with economic goals, it has adopted several environmental conventions, among others, the Water Convention. In addition, the title of the Water Convention contains both the terms 'use' and 'protection', yet we may discern a dominance of the environmental provisions from the text. Consequently, both Conventions attest to the fact that the economic and the environmental interests are inseparable.

3.4. The Environmental Provisions of the Watercourses Convention

This part shall concentrate on the environmental provisions of the Watercourses Convention. In evaluating the environmental provisions of the Watercourses Convention, first, its framework convention character has to be reaffirmed. Consequently, it cannot be expected the same level of protection as in the case of regional or bilateral agreements in the developed states. Although numerous proposals were made during the negotiations in order to strengthen the environmental standpoint, very few were ultimately accepted.[445] This was regrettable; however, an environmentally stronger text would ultimately have received less support for the Watercourses Convention.[446]

The environmental references can be discovered, on the one hand, in the Preamble such as reference to the protection and sustainable utilization of international watercourses as well as to the principles and recommendations of the Rio Declaration and Agenda 21 adopted by the United Nations Conference on Environment and Development in 1992. However, there is also reference to the 'special situation' of developing countries, which, as mentioned above, must have had an influence on the level of the environmental protection. On the other hand, environmental provisions can be also found in Part IV on Protection, Preservation and Management, namely Article 20 on Protection and preservation of ecosystems, Article 21 on Protection, reduction and control of pollution, Article 22 on Introduction of alien or new species and finally, Article 23 on Protection and preservation of the marine environment.

[445] UN Doc. A/C.6/51/SR.15., Summary Record of the 15th Meetingin New York on 8 October 1996, Agenda Item 144: Convention on the Non-navigational Uses of International Watercourses (continued).
[446] McCaffrey, 2001, p. 257.

3.4.1. Protection and Preservation of Ecosystems

Before digging ourselves into the analysis of Article 20 on Protection and preservation of ecosystems, it is worth recalling McCaffrey's observation, who evaluated this article as "a simple but potentially quite powerful provision".[447] In addition, in order to further illustrate the current status of the protection of the ecosystem, the Commentary of the ILA's Berlin Rules has to be mentioned. Though, as mentioned before, these are not binding rules, but their importance cannot be questioned in the light of ILA's activity in the field of international water law with special regards to their role ILA's rules played in the drafting of the Watercourses Convention. So, the reference to the Berlin Rules is not merely attributable to the fact that these are the most recent universal documents concerning freshwater. The Commentary of the Berlin Rules concerning the protection of the ecosystem states that it is a recently recognized, but rapidly generally accepted obligation; furthermore; its real content is discharged through the fulfilment of other obligations.[448]

Following Article 192 of the UNCLOS,[449] Article 20 of the Watercourses Convention prescribes that

"Watercourse States shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of international watercourses".

As mentioned in the Commentary of the Watercourses Convention, the ILC was of the opinion that this article, which lays down a general obligation, should precede the more specific articles of this part of the Watercourses Convention.[450]

In analysing the elements of this definition, first, the meaning of the Watercourse State will be discussed.

"Watercourse State means a State in whose territory part of an international watercourse is situated, or a Party that is a regional economic integration organization, in the territory of one or more of whose Member States part of an international watercourse is situated".[451]

Secondly, it has to be mentioned that despite using the word 'shall' to refer to the mandatory character of these obligations, without any doubt the obligations to protect and

[447] McCaffrey, 1997, p. 24.
[448] Commentary of the Berlin Rules relating to Article 22 on Ecological Integrity.
[449] Art. 192 of the UNCLOS stipulates that "states have the obligation to protect and preserve the marine environment".
[450] Commentary of the Watercourses Convention, 1994, p. 118.
[451] Art. 2(c) of the Watercourses Convention.

preserve are not absolute ones, but obligation of due diligence.[452] Furthermore, using the word 'shall' throughout the whole text in the Watercourses Convention was one of the reasons it was highly criticised as it triggered uncertainties in the interpretation of several articles. Although Article 20 definitely belongs to them, the main concerns were raised relating to other articles such as the relationship between the principle of equitable and reasonable utilization and the principle not to cause significant harm, as upper riparians tend to favour the former one, while lower riparians the latter one.[453] In addition, the due diligence nature of Article 20 can be further backed, first and foremost, by another document adopted by the ILC on freshwaters, namely the Draft articles on the Law of Transboundary Aquifers that opted for describing the due diligence nature of these commitments by the phrase "take all appropriate measures".[454] This list can be augmented by Article 22 of the Berlin Rules on Ecological Integrity as it prescribes that "States shall take all appropriate measures to protect the ecological integrity necessary to sustain ecosystems dependant on particular waters". As can be seen, as was the case with the Watercourses Convention, Article 22 of the Berlin Rules does not prescribe an absolute obligation. Finally, a multilateral convention can be mentioned concerning River Elbe that states that

"The contracting parties shall cooperate in the International Commission for the Protection of the Elbe (…) to prevent the pollution of the Elbe and its drainage area. They shall in so doing in particular endeavour: to achieve as natural an ecosystem as possible with a healthy diversity of species".[457]

This document opted for the term 'endeavour' to clarify the not absolute character of this provision. Not to mention, the phrase "as natural an ecosystem as possible" also suggests that it is not possible to achieve a completely natural ecosystem.Thirdly, relating to

[452] McCaffrey, 1997, p. 24.

[453] A. Schwabach, 'The United Nations Convention on the Law of the Non-navigational Uses of International Watercourses, Customary International Law, and the Interests of Developing Upper Riparians', *Texas International Law Journal*, Vol. 33. No. 2, 1998, pp. 276-278; C.B. Bourne,' The Primacy of the Principle of Equitable Utilization in the 1997 Watercourses Convention', Canadian Yearbook of International Law, Vol. 35, 1997, pp. 215-232; Helal, 2007, pp. 337-378.

[454] Art. 10 of the Draft articles on the Law of Transboundary Aquifers states that 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 that the quality and quantity of water retained in an aquifer or aquifer system, as well as that released through its discharge zones, are sufficient to protect and preserve such ecosystems."

[457] Art. 1 of the Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe, adopted in Magdeburg on 8 October 1990.

"individually and, where appropriate, jointly", we have to refer to Article 8 of the Watercourses Convention on General obligation to cooperate, which stipulates that *"1. Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse.2. In determining the manner of such cooperation, watercourse States may consider the establishment of joint mechanisms or commissions, as deemed necessary by them, to facilitate cooperation on relevant measures and procedures in the light of experience gained through cooperation in existing joint mechanisms and commissions in various regions"*.[458]

Turning our attention to the obligations to protect and preserve, the very first observation can be that these obligations are cumulative ones; consequently, Watercourse States have to fulfil both of them to meet the requirements of this article. Before discussing these obligations in detail, it is worth noting the references to protection and preservation can be found throughout the text of the Watercourses Convention. Probably one of the most remarkable one is when determining the scope of the Watercourses Convention, which refers to "measures of protection, preservation and management related to the uses of those watercourses and their waters".[459] As can be seen, the term 'management' appears as an additional obligation that is discussed in detail in Article 24 of the Watercourses Convention.[460] In analysing the precise meaning of these obligations, namely obligation to protect and preserve, it is vital to use the Commentary of the Watercourses Convention as a starting point, as it construes these terms that are essential to the proper understanding of Article 20.

Firstly, the obligation to 'protect' requires the watercourse States to "shield the ecosystems of international watercourses from harm and damage". As pollution is the key element of our analysis, we have to nail our colours to the must that the term protection

[458] See: C. Leb, *Cooperation in the law of transboundary water resources,* Cambridge Univ Press, Cambridge, 2015.
[459] Art. 1(1) of the Watercourses Convention.
[460] See Art. 24 of the Watercourses Convention stipulates that "1. Watercourse 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. 2. For the purposes of this article, "management" refers, in particular, to: (a) Planning the sustainable development of an international watercourse and providing for the implementation of any plans adopted; and (b) Otherwise promoting the rational and optimal utilization, protection and control of the watercourse".

includes but not limited to the protection against pollution.[461] As explicated in the Commentary of the Watercourses Convention,

"Adequate protection encompasses measures relating to conservation, security, and water-related disease, as well as technical and hydrological 'control' mechanisms, such as the regulation of flow, floods, pollution, erosion, drought and saline intrusion".[462] Nonetheless, as can be seen, all of these 'mechanisms' affect water quality this or that way. However, finally, they were located in separated articles, such as Article 27 on Prevention and mitigation of harmful conditions[463] and Article 28 on Emergency situations.[464]

Secondly, while the obligation to 'preserve' is applicable especially to those freshwater ecosystems that are in a "pristine or unspoiled condition". It aims to protect those ecosystems in such a way to maintain their natural state".

"Additionally, the obligation to protect includes the duty to shield ecosystems from a significant threat of harm".[465] However it should be noted that, on the basis of equity, the ultimate decision whether or not to preserve a particular ecosystem in a 'pristine or unspoiled condition' will be weighed against all relevant factors, including the social and economic needs of watercourse states". In weighing up such factors, Utton and Utton point out that, "for many states, the preservation of wild and scenic watercourses would prove too great a development sacrifice"." However, the aforementioned authors also point out that,

"'where politically feasible, such a strategy should be employed to protect what few unspoiled stretches of rivers remain today. Depending upon the usages allowed under a wild and scenic watercourse regime, the economic advantages of a pristine river system

[461] See: Preamble of the Watercourses Convention states that the "framework convention will ensure the utilization, development, conservation, management and protection of international watercourses".
[462] Commentary of the Watercourses Convention, 1994, p. 97.
[463] Art. 27 of the Watercourses Convention on Prevention and mitigation of harmful conditions states that "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 flood or ice conditions, water-borne diseases, siltation, erosion, salt-water intrusion, drought or desertification".
[464] Art. 28(1) of the Watercourses Convention determines that Emergency situations "For the purposes of this article, "emergency" means 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".
[465] A. Rieu-Clarke, R. Moynihan & B.-O. Magsig, *UN Watercourses Convention User's Guide*, IHP-HELP Centre for Water Law, Policy and Science, Dundee, 2012, pp. 165-166.

may make up for the sacrificed developmental usages'. Recognition of the economic benefits of ecosystems is embodied in the notion of 'ecosystem services'".[466]

As can be seen, this argumentation encompasses the three pillars of sustainable development, so this is an additional example to illustrate its significance.

Last but not least, the term 'ecosystems' are determined as

"an ecological unit consisting of living and non-living components that are interdependent and function as a community" of which an important feature is that "everything depends on everything else and nothing is really wasted".[467]

The term 'ecosystem' was favoured instead of the term 'environment', as this latter one

"could be interpreted quite broadly, to apply to areas "surrounding" the watercourses that have minimal bearing on the protection and preservation of the watercourse itself. Furthermore, the term "environment" of a watercourse might be construed to refer only to areas outside the watercourse, which is of course not the intention of the Commission".[468]

Regarding the term ecosystem two other concepts have to be explained.

First, the phrase 'ecosystem services' will be specified, which was also mentioned by Utton and Utton and may be defined as

"benefits people obtain from ecosystems such as: energy, food and water, biomedicines, flood prevention, biodiversity, climate regulation, erosion control, pest and pathogen control, soil formation, nutrient cycling, recreation, heritage, spiritual or personal fulfillment and other non-material benefits".[469]

Second, when it comes to the protection of ecosystems of international watercourses, we have to make a mention of the concept of 'environmental flows'. Despite having no

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[466] Ibid., p. 167.

[467] Commentary of the Watercourses Convention, 1994, p. 118.

[468] Ibid.; Interestingly, A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 286. contains the following thoughts: „For some purposes "environment" is described, or defined, as the "assemblage of material factors and conditions surrounding the living organism and its component parts". Thus it includes "both external and internal factors. In the external environment inanimate objects and the forces associated with them constitute the physical environment, and the living things and their derivatives with which the animal may be associated constitute the organic environment."In modern practice, aesthetics and vegetation and even bacterial populations are embraced.504 Many industrial processes, and perhaps more significantly "human habitats", involve substantial control of the environment, while in the field of environmental protection, preserving or restoring the free state of nature is the fundamental focus, plus the special feature of improving the "quality of life" for man".

[469] Annex 7.E of Agreement between Canada and the United States of America on Great Lakes Water Quality, 2012.

explicit reference to this concept in Article 20, as reasoned in the Commentary Watercourses Convention, the

"need to 'ensure stream flows adequate to protect the biological, chemical, and physical integrity of international watercourses, including their estuarine zones' can be considered as inherent in the obligation to protect ecosystems of international watercourses".[470]

Finally, it is worth referring to a few bilateral agreements concerning ecosystem in that hope that they can contribute to the better understanding of Article 20 of the Watercourses Convention. Firstly, it is worth referring to the Agreement Between Canada and the United States of America on Great Lakes Water Quality. Besides containing provisions relating to the ecosystem, this agreement determines the 'ecosystem approach' as "taking management actions that integrate the interacting components of air, land, water, and living organisms, including humans".[474] As can be seen, this approach highlights the relationship between the environmental elements that are important as pollution can circulate between them. Secondly, two conventions have to be mentioned relating to the protection of the River Oder and Elbe. Starting with the Convention on the International Commission for the Protection of the Oder, it prescribes the obligation "to achieve the most natural aquatic and littoral ecosystems possible with the corresponding species diversity".[475] Moving onto the Convention on the International Commission for the Protection of the Elbe, it declares „to achieve as natural an ecosystem as possible with a healthy diversity of species."[476] Two ascertainments can be added to these provisions. On the one hand, by using the word 'achieve', we can suspect that the current level of protection is not sufficient. On the other hand, by using the phrase "as possible", two things may be suggested. First, it is not possible to achieve a complete or absolute level of protection. Second, we can recall once again the three pillars of sustainable development, which can remind us that it is crucial to find balance between the different interests.

[470] Rieu-Clarke, Moynihan & Magsig, 2012, p. 167.
[474] Art. 2.4(f) of Appendix to the Protocol Amending the Agreement Between Canada and the United States of America on Great Lakes Water Quality, 1978, as Amended on October 16, 1983 and on November 18, 1987. Agreement Between Canada and the United States of America on Great Lakes Water Quality, 2012.
[475] Art. 2(b) of the Convention on the International Commission for the Protection of the Oder.
[476] Art. 1.2(b) of of 1990 Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe.

3.5. The Regulation of Water Pollution in the Watercourses Convention

After clarifying the similarities between the two Conventions, we will concentrate on the analysis of water pollution in the Watercourses Convention. However, before doing so, the activity of three special rapporteurs, namely Stephen M. Schwebel,[477] Jens Evensen[478] and Stephen C. McCaffrey[479] must be stressed, since they all significantly contributed to the crystallization of the provisions relating to water pollution. While working on this topic, the significance and the challenges inherent in this policy field were best illustrated with the ILC's conclusion, namely the "problem of pollution of international waterways was of both substantial urgency and complexity".[480] In this part we wish to analyse Article 21 of the Watercourses Convention on Prevention, reduction and control of pollution will be discussed. First, Article 21(1) on Pollution of international watercourse will be analysed, followed by Article 21(2) on Prevent, reduce and control of pollution. Finally, we will shortly refer to Article 21(3) on Obligation to consult.

3.5.1. Article 21(1) on Pollution of International Watercourse

Article 21(1) on the 'pollution of international watercourse' stipulates that

"pollution of an international watercourse means any detrimental alteration in the composition or quality of the waters of an international watercourse which results directly or indirectly from human conduct".

As indicated in the Commentary of the Watercourses Convention, this definition is far too general,[487] albeit consistent with the definition of pollution in the ILA's Helsinki

[477] A/CN.4/348 and Corr.1 Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Yearbookof the International Law Commission*, 1982, Vol. II(1).

[478] A/CN.4/367 and Corr.1 First report on the law of the non-navigational uses of international watercourses, by Mr. J. Evensen, Special Rapporteur, *Yearbook of the International Law Commission*, 1983, Vol. II(1); A/CN.4/381 and Corr.1 and Corr.2 Second report on the law of the non-navigational uses of international watercourses, by Mr. Jens Evensen, Special Rapporteur, *Yearbook of the International Law Commission*, 1984, Vol. II(1).

[479]A/CN.4/412 and Add.1 & 2 Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Yearbook of the International Law Commission*: 1988, Vol. II(1).

[480] A/CN.4/270, *Yearbook of the International Law Commission*, 1973, Vol. II, p. 96.

[487] Commentary of the Watercourses Convention, 1994, p. 121.

Rules[488] as well as with the ILA's Berlin Rules.[489] The ILA opted for this broad definition for several reasons, among others, due to the fact that the "nature and effect of pollutants are likely to change over time".[490] Interestingly, the Draft articles on the Law of Transboundary Aquifers neither contain the definition of water pollution nor refer to the definition of the Watercourses Convention**.** In what follows, the elements of this definition will be analysed in detail, followed by further observations on this paragraph. However, before doing so, it has to be mentioned, on the one hand, that the concept of pollution is 'inherently qualitative'. "It deals not with flooding, impediments to fish migration, or water level changes *per se".* Though *"*The environment (…) may be seriously damaged by these and many other non-"polluting" phenomena".[491] On the other hand, conversely, "it is not possible to subsume all environmental problems under the rubric of pollution".[492] In addition, it cannot be overemphasised that this

"definition is a "physical" one, not one defining pollution in terms of what is detrimental to the legally protected interests of States. The definition thus imports no notion or condition of legal injury. (...) Whether the consequences of such alteration require any degree of abatement as a matter of law is a separate question dealt with in other provisions of the article".[493]

3.5.1.1. The Detrimental Alteration

It is worth highlighting, first, that the term 'any detrimental alteration' does not specify the threshold which would make it possible to draw a line between legal and illegal pollution. Consequently, paragraph 1 declares the general prohibition of water pollution *per se*, as it encompasses all forms of negative alterations regardless of their effects.[494] Second, the question emerges what the precise meaning of 'detrimental effect' actually

[488] A. Rieu-Clarke, R. Moynihan & B.-O. Magsig, *UN Watercourses Convention User's Guide*, IHP-HELP Centre for Water Law, Policy and Science, Dundee, 2012, p.173. See; ILA Helsinki Rules (1966) Art. IX defines 'water pollution' as "any detrimental change resulting from human conduct in the natural composition, content, or quality of the waters of an international drainage basin".; Á. Bujdos, Water pollution and the rules of the International Law Association, in M. Szabó (Ed.) Doktoranduszok Fóruma, Miskolci Egyetem, Miskolc, 2014, pp. 63-68.

[489] See; Art. 3 of International Law Association Berlin Conference (2004) Water Resources Law, which defines 'pollution' as "any detrimental change in the composition or quality of waters that results directly or indirectly from human conduct".

[490] Rieu-Clarke, Moynihan & Magsig, 2012, p. 176.

[491] A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 321.

[492] A/CN.4/348 and Corr.1, para. 247.

[493] A/CN.4/348 and Corr.1, para. 313.

[494] Commentary of the Watercourses Convention, 1994, p. 121.

is.[495] Regarding this question a similar term, namely 'detrimental change' has to be recalled. This can be identified in the Helsinki Rules, which is undeniably the most significant document preceding the Watercourses Convention.[496] The Commentary of the Helsinki Rules provides an insight into the meaning of this phrase, which can be interesting for two reasons. On the one hand, the term 'detrimental' determines the direction of alterations in the meaning of the article, which is negative in comparison with the previous state of the water; on the other hand, it leaves open the question of the degree of the alteration, which means, at least in theory, that every negative change may come under the scope of these rules.[497] However, this would stand in sharp contrast with the concept of environmental economics, which holds that a certain degree of pollution is unavoidable.[498] Furthermore, even the ILC confirms that

"The rule embodied in paragraph 2 does not proscribe all pollution of an international watercourse [system], no matter how insignificant in amount or effect. In fact, it is doubtful that pollution, per se, of an international watercourse can be said to be proscribed by contemporary international law".[499]

Moving onto the second part of the phrase, namely the 'alteration', one can identify this term in several preceding universal documents such as the IIL's Madrid Declaration, which refers to "all alteration injurious to water"[500] as well as the IIL's Athens Resolution, which refers to "physical, chemical or biological alteration".[501] From the point of view of the current analysis, particularly the wording of the Athens Resolutions can be instructive, as it completely coincides with the terminology employed in the previous drafts of the Watercourses Convention.[502] These three types of alterations, namely

[495] Ibid.
[496] See; Art. IX of the Helsinki Rules.
[497] Commentary of the Helsinki Rules on the Uses of the Waters of the International Rivers (1966).
[498] Perman *et al*., *Natural resources and environmental economics*, 3rd ed., Prentice Hall, New York, 2003, pp. 170-171.
[499] A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), p. 238.
[500] Art. II.2. of International Regulations Regarding the Use of International Watercourses for Purposes Other than Navigation (1911).
[501] Art.I.1 of The Pollution of Rivers and Lakes and International Law (1979). See further: Art. 2.1 of Agreement between Canada and the United States of America on Great Lakes Water Quality, 2012: "The purpose of this Agreement is to restore and maintain the chemical, physical, and biological integrity of the Waters of the Great Lakes."
[502] See: Art. 22 of A/CN.4/367 and Corr.1., First report on the law of the non-navigational uses of international watercourses, by Mr. J. Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1983, Vol. II(1); Art. 22. of A/CN.4/381 and Corr.1 and Corr.2., Second report on the law of the non-navigational uses of international watercourses, by Mr. Jens Evensen,

physical, chemical and biological are alternatives; consequently, an alteration in merely one of them is sufficient to trigger pollution. As explained in the Commentary of the Watercourses Convention, ILC excluded the 'biological alteration' from the scope of Article 21 and devoted a separate article, namely Article 22, to it. This is because even though the 'introduction of alien or new species' may have harmful effects upon water quality, it is not generally regarded as pollution *per se*, since its detrimental effects on the environment are not generally regarded as pollution.[503] However, this current approach of the Watercourses Convention begs the question what is the legal position with regard to those 'biological alterations', which do not fall under the scope of Article 22, such as the introduction of native species,[504] the aquatic invasive species[505] or any other forms of 'biological alterations'. It can be argued, on the one hand, that Article 21 applies to 'any detrimental alteration' covering physical, chemical and biological alterations, yet on the other hand, Article 22 regulates merely special kinds of biological alterations, consequently, all kinds biological alterations outside the scope of Article 22 may be covered by Article 21. However, as stated in the commentary of an earlier draft, the term 'substances' cannot not be interpreted to include plants, animals (for example, varieties of fish) and other living organisms including parasites, predators and vectors". That is why this earlier draft opted for adding the word 'species' to the definition. [506]

Moreover, as illustrated below, the significance of 'biological alterations' in identifying any change in water quality cannot be overemphasized, as

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Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1984, Vol. II(1); Art. 16 [17]. of A/CN.4/412 and Add.1 & 2., Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1).

[503] Commentary of the Watercourses Convention, 1994, p. 122. Moreover, Art. 25. of the Berlin Rules cover only alien species.

[504] See; Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on an Amendment to the List of Key Threatening Processes under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) http://www.irrigators.org.au/assets/uploads/news/feb-2012-8.pdf

[505] Art. 4.2.(b)(i) of Agreement between Canada and the United States of America on Great Lakes Water Quality, 2012. Annex 6.E.1. of Agreement between Canada and the United States of America on Great Lakes Water Quality 2012 defines 'Aquatic Invasive Species' (AIS) as "any non-indigenous species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that threatens or may threaten the diversity or abundance of aquatic native species, or the ecological stability, and thus water quality, or water quality of infested waters, or commercial, recreational, or other activities dependent on such waters.

[506] A/CN.4/348 and Corr.1., Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 319.

"The introduction of various species can, for example, accelerate eutrophication, clog intakes and machinery, damage fisheries and aquacultures, reduce available oxygen, spoil recreation or transmit disease. The effects of such introduction can in some watercourses be as serious as, if not more so than, many contaminating substances (non-living) and be highly difficult to eradicate once introduced and established".[507]

Nonetheless, contrary to the 'easily' determinable parameters regarding chemical and physical alterations, "organisms and biological communities can be defined with much less precision". However, biological examinations are also important for several reasons. First, these are important not only from the point of view of Article 21(1), but also from that of Article 21 (2), since the latter article explicitly refers to 'harm to the environment', including 'living resources'. As a result, 'living resources' have to be quantified somehow, and the results of these measurements can serve as an early warning of 'potential harm'.[508] Second, both "animal and plant communities respond to intermittent pollution", consequently, biological examinations can challenge the shortcomings of chemical and physical surveys, which provide information on water quality at a particular moment in time, but not between the sampling occasions. In addition, as pollutions kill the most vulnerable species of the aquatic environment, they can act as indicators of pollution.[509] Third, "biological communities may respond to unsuspected or new pollutants in the environment", while during chemical and physical surveys merely a couple of pre-set determinants are tested.[510] Finally, "chemicals are accumulated in the bodies of certain organisms, concentrations within them reflecting environmental pollution levels over time". Consequently, while the concentration of the pollutants can be too low to detect with the other methods, they can be accumulated in some species.[511]

As mentioned above, those pollutants that are "chemical or physical in nature can be measured more or less accurately in water" and the results of these measurements are easily comparable with each other and the permitted level.[512] In order to illustrate this statement, we can recall our analysis regarding the physical characteristics of water in

[507] Ibid.
[508] C.F. Mason, Water Pollution Biology *in* R.M. Harrison (Ed.), *Pollution: Causes, Effects and Control*, 4th ed., Royal Society of Chemistry, Cambridge, 2001, p. 82.
[509] Ibid.
[510] Ibid.
[511] Ibid. p. 83.
[512] C.F. Mason, Water Pollution Biology *in* R.M. Harrison (Ed.), *Pollution: Causes, Effects and Control*, 4th ed., Royal Society of Chemistry, Cambridge, 2001, p. 82.

general. In addition, we have to lay emphasis on thermal pollution as a special type of physical alteration.. As stated in the Commentary of the Watercourses Convention, *"thermal pollution would be included in the proposed definition. Indeed, heat is an important by-product of many industrial and energy-producing processes, such as steel mills and nuclear power plants".*[513]

Further, it has to be mentioned the "increasingly serious problem of pollution of watercourses by "acid rain", or atmospheric deposition of toxics, would also be included within the proposed definition,"[517] as reasoned in the Commentary of the Watercourses Convention.

Our final remark regarding the 'detrimental alteration' relates to the term 'detrimental change' as enshrined in the Helsinki Rules. Although the meaning of these phrases seems to be a slightly different they can be recognized as synonyms, especially since the Berlin Rules opted for exactly the same terminology as the Helsinki Rules instead of the terminology employed by the Watercourses Convention. The use of this common terminology cannot be explained by the fact that the same organisation, namely the ILA, adopted both of them, as there were nearly four decades of significant developments in the field of international water law between their adoption. Among others, the adoption of the Watercourses Convention definitely belongs to these milestones and to top it all, it was referred to in the Commentary of the Berlin Rules. Consequently, should the ILA have wished to recognize any difference between them, it must have taken the opportunity to point out such deviation through a different phrasing in the Berlin Rules, especially since the Berlin Rules are generally regarded as representing an even higher level of environmental protection than all the aforementioned documents. In addition, alternatively, the word 'impairment' can be also used to express the 'detrimental change' just like in the 1974 draft of the European convention on the protection of fresh water against pollution, which says "any impairment of the composition or state of water".

[513] A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), comments relating to Art. 16 [17]. Pollution of international watercourse[s] [systems].

[517] A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), comments relating to Art. 16 [17]. Pollution of international watercourse[s] [systems].

3.5.1.2. The Composition or Quality of Waters

Concerning the 'detrimental alteration' it has to be mentioned that it occurs in the "composition or quality of the waters of an international watercourse". In the following, we will confine our analysis to the terms 'composition' and 'quality', since the meaning of both 'water' and 'international watercourse' have been discussed while comparing the two Conventions. Starting with the term 'composition', it refers to *"all substances contained in the water, including solutes, as well as suspended particulate matter and other insoluble substances"*. One can easily discern that this list is not exhaustive; furthermore, some characteristics of substances are defined in terms of their solubility (both soluble and insoluble substances are covered by this definition) while others in terms of their position in the water (such as "suspended particulate matter"). However, this definition begs further questions relating to the location of the 'substances' as well as to the interpretation of this term. It may be advisable to interpret the term 'substances' broadly covering solid objects as well.[522] This approach can be justified by the fact that besides substances or compositions of substances,[523] objects suspended in or floating on the water surface may also have negative impacts, as they affect, among others, the amenity function of waters.[524] In addition, we are lucky to be able to invoke the commentary of an earlier draft once again in which it is stated that the term 'substance' "might not be interpreted to include plants, animals (for example, varieties of fish) and other living organisms including parasites, predators and vectors," furthermore, "may connote things inert, at least not alive".[525] Further, in default of definition of the term 'substance' in the universal freshwater conventions, it can be practical to take a glimpse at the EU legislation to check how this question is approached there. Fortunately, we can rely, on the one hand, on Directive 2004/42/CE[526] that defines 'substances' as "any

[522] See; Art. 2(1) of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which defines 'wastes' as „substances and objects".
[523] See, e.g.; Sandoz chemical spill accident in 1986, when chemicals washed into the Rhine "formed a red toxic trail 70 kilometers long". A. Boos-Hersberger, 'Transboundary Water Pollution and State Responsibility: The Sandoz Spill', *Annual Survey of International & Comparative Law*, Vol. 4, No. 1, 1997, p.106. See also: A. Schwabach, The Sandoz Spill: The Failure of International Law to Protect the Rhine from Pollution, *Ecology Law Quarterly*, Vol. 16, No. 2, 1989, pp. 443-480.
[524] See, e.g.; Drina river's floating problem. https://www.icpdr.org/main/publications/drina-rivers-floating-problem
[525] A/CN.4/348 and Corr.1., Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 319.
[526] Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC. See also: Council Directive

chemical element and its compounds, as they occur in the natural state or as produced by industry, whether in solid or liquid or gaseous form".[527] Although this definition was adopted to regulate a very specific field, its significance should not be underestimated as it draws attention to two important things. First, it highlights that 'substances' cover both natural and artificial substances. Second, they can occur in three forms, such as solid, liquid and gaseous form. On the other hand, the definition of 'substance' in the Council Directive 86/280/EEC can be mentioned that defines 'substances' as "those dangerous substances, belonging to the families and groups of substances appearing in List I in the Annex to Directive 76/464/EEC, which are specified in Annex II to this Directive.[528] However, as can be seen, contrary to its quite general denomination, it has a limited scope as it refers merely to dangerous substances. As a result, these definitions also follow that approach of the Commentary of the Watercourses Convention, namely the term 'substance' indeed does not cover species. However,, our dilemma concerning the relationship between Article 21 and Article 22 of the Watercourses Convention, more specifically relating to the 'biological alterations' not covered by Article 22 is still there. In addition, our train of thought could be continued with phrases such as 'hazardous substances' or 'substances hazardous to water', however, we have discussed them concerning the classification of substances.

Moving onto the question of the location of these substances, it follows from the definition of 'composition' as well as from the previous argumentation that besides substances located in the water, floating substances may be also covered. Furthermore, substances deposited in the soil of the water body should not be overlooked either, as the term 'international watercourse' covers both the channel itself and the water in it.[529] To illustrate the relevance of the soil, among others, the Baia Borsa pollution on 10 March 2000 may be recalled, when 20,000 tonnes of tailings sludge containing heavy metals, overflowed and burst the dam.[530] Although after the accident the majority of the heavy

1999/13/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

[527] Art. 2.2. of Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC and Art. 2. 14. of Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

[528] Art. 2(a) of Council Directive 86/280/EEC of 12 June 1986 on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC.

[529] Commentary of the Watercourses Convention, 1994, p. 89.

[530] Report of the International Task Force for Assessing the Baia Mare Accident, December 2000, p. 7.

metals remained in the vicinity of the polluter mining company, it was expected to migrate downstream with the floods, and finally it would become dispersed in the water.[531] Based on the prediction of the scientists approximately 15 years were necessary for the traces of this accident and the heavy metals (among others, copper, zinc and lead) to disappear.[532]

At last, concerning the term 'quality', as mentioned before, it can be noted that it is *"commonly used in relation to pollution, especially in such expression as 'air quality' and 'water quality' and 'it refers generally to the essential nature and degree of purity of water,"*[533] in other words, "the physical, chemical and biological characteristics of water". In summary, it can be concluded that polluted water has more 'negative qualities' than positive ones.[534]

3.5.1.3. Results Directly or Indirectly from Human Conduct

Before analysing the phrase "directly or indirectly from human conduct", first the term 'result' will be examined. Article 21(1) does not determine the exact means by which water pollution can be triggered such as 'introduction',[535] 'discharge'[536] 'release'[537] or 'injection'. Consequently, among others, the reduction of the water quantity affecting water quality[538] as well as the change in water velocity may be also covered by this definition. Interestingly, if we take a look at the EU law,[539] on the one hand, the Water Framework Directive opted for a definition of pollution including the word introduction,

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[531] Ibid. p. 15.
[532] A. Szakats, 'Cross Border Pollution - Private International Law Problems in Claiming Compensation', *Victoria University of Wellington Law Review*, Vol. 32, 2001, p. 611.
[533] Commentary of the Watercourses Convention, 1994, pp. 121-122.
[534] S.K. Agarwal, *Water Pollution*, A.P.H. Publishing Corp., New Delhi, 2005, p. 37.
[535] See, e.g.; Art. 22 of A/CN.4/367 and Corr.1., First report on the law of the non-navigational uses of international watercourses, by Mr. J. Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1983, Vol. II(1).; Art. 22. of A/CN.4/381 and Corr.1 and Corr.2., Second report on the law of the non-navigational uses of international watercourses, by Mr. Jens Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1984, Vol. II(1).; Art. 2. (33) of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
[536] See, e.g.; Art. 1.(2)d Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community; Art. 5.4(b) of the 1999 Convention on the Protection of the Rhine; Art. 2.1(a)(b)(f) of the 1990 Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe.
[537] Preamble and Art. 7(2) of the 1994 Convention on Cooperation for the Protection and Sustainable use of the Danube River (Danube River Protection Convention).
[538] A. Tanzi & M. Arcari, *The United Nations Convention on the Law of International Watercourse: a framework for sharing*, Kluwer Law International, London, Boston, 2001, p. 250.
[539] Remark: It was necessary to check the EU law in dafault of definition of introduction in the universal, regional (other than EU law) and bilateral agreements regarding freshwater.

which may be interpreted as "covering discharges, emissions and losses of priority substances".[540] On the other hand, Bathing Water Directive has a different approach as it lays down that 'pollution' means the presence of microbiological contamination or other organisms or waste affecting bathing water quality and presenting a risk to bathers' health as referred to in Articles 8 and 9 and Annex I, column A".[541] In other words, this definition focuses on the function of bathing water, so merely the occurrence of substances influencing the water quality is relevant, not the way they enter into the water. Second, the term 'human conduct' will be discussed, which intends to differentiate between natural and anthropogenic pollution, since only the latter one can be the subject of legal regulation.[542] This phrase has to be interpreted that way that it covers

"pollution involves the use of water by man (or his animals, crops or industries) and the impact upon water of other activities for which man is responsible, with consequent detrimental effect".[543]

At the same time, it is understood to cover both acts and omissions, which is preferred to other terms such as 'human activities'.[544] This approach of the ILC can be justified by several events in the past when pollution occurred as a result of human omission such as the case of Baia Mare cyanide pollution or the Baia Borsa heavy metal pollution in 2000,[545] just to name a few examples.

Third, the interpretation of the terms 'directly or indirectly' will be examined. In analysing the exact meaning of these words, the question is how to differentiate between those cases when pollution results "directly or indirectly from human conduct" will be addressed, however, determining the margins of the term 'indirectly' can be more challenging. As far as incidents 'directly' resulting 'from human conduct' are concerned, several accidental pollutions can be mentioned in which human action or more commonly omission played a role such as the said cyanide and heavy metal pollution of the River Tisza in 2000. To illustrate those cases when water pollution results indirectly from human conduct, among others, sediments in the water as a result of deforestation can be

[540] See e.g. Art. 1. c) e) of the Water Framework Directive.
[541] Art. 2(5) of Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC (Bathing Water Directive).
[542] Hanqin, 2003, p. 6.
[543] A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 247.
[544] Commentary of the Watercourses Convention, 1994, p. 122.
[545] Report of the International Task Force for Assessing the Baia Mare Accident, December 2000, p. 10.

mentioned or cases when pollutants reach the watercourses via the atmosphere. Turning our attention to the scope of the term 'indirectly', it remains an open question, *inter alia*, whether "pollution caused or aggravated by climate change (e.g. changes in water temperature) could be considered as resulting indirectly from human conduct".[546] Moreover, it has to be highlighted that the

"frequent and persistent problem of the intrusion of salt water into fresh water, surface and underground, is within the definition of pollution to the extent that human intervention has induced the salt water invasion, initially or to an increased degree or reach".[547]

In addition, dams can be mentioned relating to "spills of highly toxic chemicals". [548]

Finally, as an illustration of the phrase "directly or indirectly", a bilateral agreement, namely the Great Lakes Water Quality Agreement will be referred to, as it determines as an objective concerning the "Waters of the Great Lakes" that they should *"be free from nutrients that directly or indirectly enter the water as a result of human activity, in amounts that promote growth of algae and cyanobacteria that interfere with aquatic ecosystem health, or human use of the ecosystem".*[549]

At last, it has to be emphasized that the lack of threshold in Article 21(2) does not mean that it cannot be evaluated independently, without the subsequent paragraphs in Article 21. This viewpoint can be supported by the fact that any change in the conditions of the watercourses already increases the likelihood of a significant adverse impact on the environment.[550]At the same time, *"detrimental effects which do not rise to the level of appreciable harm should be the subject of "reasonable measures" of abatement".* Consequently, 'detrimental' pollutions falling below the threshold of 'significant harm', should not be considered to be without any legal consequence,[551] since dealing with such

[546] F.R. Loures, C. Behrmann & A. Swain, Convention on Climate Change *in* F.R. Loures & A. Rieu-Clarke (Eds.), *The UN Watercourses Convention in force: strengthening international law for transboundary water management* , Routledge, Abingdon, Oxon, 2013, p. 215.

[547] A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 318.

[548] A/CN.4/348 and Corr.1, para. 145.

[549] Art. 3(1)a)vi) of the Agreement between Canada and the United States on Great Lakes Water Quality Agreement (Great Lakes Water Quality Agreement), signed in Washington, on 7 September 2012.

[550] The Relationship between the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 25 February 1991) and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 17 March 1992) p. 13.

[551] A. Tanzi & M. Arcari, *The United Nations Convention on the Law of International Watercourse: a framework for sharing*, Kluwer Law International, London, Boston, 2001, p. 251.

pollutions cannot be underestimated, as they can trigger later 'significant harm' as a result of their 'cumulative effect'.[552]

3.5.2. Article 21(2) on Prevent, Reduce and Control the Pollution

Before starting our analysis on Article 21(2), it is time to make a mention of some additional ascertainments relating to transboundary water pollution.. First, although *"It is frequently said (...) that the upper riparian is at a disadvantage as concerns this matter of State responsibility, since it is presumed that most, if not all, harm proceeds from upstream to downstream. A standard consequence is that floods and contamination originating in an upstream system State may have their most harmful effects in downstream system States. Since water flow is governed by gravity (where it is not being pumped to a higher elevation), that belief seems logical, but it is only partly true"*.[553] Second, however, insufficient attention is paid to

"*State responsibility to the works and conditions downstream that may adversely affect upstream system States. (...) For example, pollution of the lower reaches of a watercourse has often proved sufficient to discourage or inhibit entirely anadromous and catadromous fish migration, adversely affecting commercial and recreational fishing upstream*".[554]

Turning our attention to Article 21(2), the first part of this paragraph stipulates that *"Watercourse States shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution of international watercourses that may cause significant harm to other watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse".*

One can easily recognize the similarity between the wording of Article 21(2) of the Watercourses Convention and Article 194(1) of the UNCLOS.[555] Article 21(2) of the Watercourses Convention establishes the fundamental obligations to "prevent, reduce and control the pollution of international watercourses". As explained in the Commentary of the Watercourses Convention, these obligations, similarly to the marine pollution, refer to the varying water quality of the international watercourses. While the obligation to

[552] Ibid. p. 252.
[553] A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, Extract from the Yearbook of the International Law Commission,1982, Vol. II(1), para. 146.
[554] Ibid.
[555] Art. 194 of UNCLOS on Measures to prevent, reduce and control pollution of the marine environment.

'prevent' relates to 'new pollution' of international watercourses, the other obligations such as the obligation to 'reduce and control' are connected to 'existing' pollution. Moreover, the obligations to 'reduce and control' pollution also reflect the state practice followed by those countries where polluted rivers are situated, namely there is

"*a general willingness to tolerate even significant pollution harm provided the watercourse State of origin is making its best efforts to reduce the pollution to a mutually acceptable level*".

This practice can be justified by the fact that the abatement of existing pollution can, in some cases, cause 'undue hardship' to the polluter State, whereas the detriment to the affected State is 'grossly disproportionate' to the benefit gained by the affected watercourse State.[556]

Regarding the obligation to prevent, first, an earlier draft of the Watercourses Convention has to be referred to in which Article 23 on Obligation to prevent pollution states that

"1. No system State may pollute or permit the pollution of the waters of an international watercourse system which causes or may cause appreciable harm to the rights or interests of other system States in regard to their equitable use of such shared water resources or to other harmful effects within their territories.

2. In cases where pollution emanating in a system State causes harm or inconveniences in other system States of a less serious nature than those dealt with in paragraph 1 of this article, the system State where such pollution originates shall take reasonable measures to abate or minimize the pollution. The system States concerned shall consult with a view to reaching agreement with regard to the necessary steps to be taken and to the defrayment of the reasonable costs for abatement or reduction of such pollution."

First, it has to be mentioned regarding the first paragraph of Article 23 that it refers to pollution causing 'appreciable harm'.[557] Before moving further, it is worth spending some time with understanding its meaning. Although some commentators differentiated between the terms such as 'serious', 'substantial' or 'sensible', Special Rapporteur

[556] Commentary of the Watercourses Convention, 1994, p. 122.

[557] Remark: Interestingly, from the Roman Law maxim "sic utere tuo ..." was deduced the rule prohibiting harmful intervention formulated by the United Nations Conference on the Human Environment in Stockholm as follows: "... States have, ... the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States .. ." See: A/CN.4/294 and Add.1,Replies of Governments to the Commission's questionnaire, Extract from the Yearbook of the International Law Commission, 1976, Vol. II(1), p. 156.

Schwebel made the conclusion that “"appreciable" is the correct and preferred term”.[558] The term

"appreciable" stands for more in quantity than is denoted by "perceptible", which could be construed to mean only barely detectable. "Appreciable" means less in quantity than terms such as "serious" or "substantial". With any such qualifying term out of ordinary language there is always the difficulty of determining, as in this case, just what quantity of harm satisfies "appreciable".[559]

In addition, it is noteworthy that by adopting the term "appreciable", the ILC wished to demonstrate that

“the effect or harm must have at least an impact of some consequence, for example on public health, industry, agriculture or environment in the affected system State, but not necessarily a momentous or grave effect, in order to constitute transgression of an interest protected by international law".[560]

Nonetheless, the Watercourses Convention finally adopted the term ‘significant harm’ to differentiate between legal and illegal pollution. ‘Significant harm’ as mentioned in the Commentary of the Watercourses Convention referred to the ’appreciable’ harm, which was described as *“harm that is significant—i.e. not trivial or inconsequential—but is less than ’substantial”, furthermore, the precondition of ’harm’ is the “actual impairment of use, injury to health or property, or a detrimental effect upon the ecology of the watercourse”*.[561] Before examining the obligations to prevent, reduce and control, it is worth noting that these are not absolute ones, but States have to exercise ‘due diligence’,[562] which was described by Dupoy as a “diligence to be expected from a good government”. Although the ‘degree of vigilance or care’ required from the States

[558] A/CN.4/367 and Corr.1, First report on the law of the non-navigational uses of international watercourses, by Mr. J. Evensen, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1983, Vol. II(1), para. 137.

[559] Ibid., para. 138.

[560] Ibid., para. 141. Interestingly, regarding harm and injury: Harm and injury: “The commission regards the word “injury” when used in the reference or treaty as having a special signification - one somewhat akin to the-term ‘injuria’ in jurisprudence. It does not mean mere harm or damage, but harm or damage which is in excess of the amount of harm or damage which the sufferer, in view of all the circumstances of the case, and of all the coexistent rights (if it be permissible to use the term in this connection), and of the paramount importance of human health and life, should reasonably be called upon to bear”. See: Final Report of the International Joint Commission on the Pollution of the Boundary Waters Reference: Washington-Ottawa, Government Printing Office, Washington, 1918, p. 34.

[561] A/CN.4/412 and Add.1 & 2, , Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), p. 238.

[562] On the due diligence see also; ILA Study Group on Due Diligence in International Law, First Report, 7 March 2014.

"depends both upon the circumstances in which pollution damage is or may be caused and the extent to which the State has the means to exercise effective control over its territory". Nonetheless, as Dupoy further emphasised, the "minimum rules concerning the attributes of good government [...] cannot be the subject of any compromise".[563] Furthermore, it is crucial to note, on the one hand,

"the higher the risk of a major impact [...]the greater the care due [...], while, on the other hand, the higher the degree of scientific, technological, economic and administrative development, and capacity of the State Party, the higher the standards of care expected and required by it".[564]

Consequently, "[toxic] pollutants requires more alertness, precaution and effort than in respect of other less harmful pollutants", therefore, States are obliged

"*to prevent even small quantities of such pollutants from crossing their borders because of the harm they would be certain to cause in the future due to their persistence and their capacity to accumulate in the food chain"*.[565]

In addition, States are obliged to 'take all appropriate measures' to prevent pollution, and if it occurs "despite all appropriate measures having being taken", they "have to comply with the ancillary obligation to take all appropriate measures [...] to control and reduce" such pollution.[566] Finally we can find several changes in the final version of the Watercourses Convention compared to the Commentary of the Watercourses Convention adopted in 1994. One of these differences can be identified in Article 7 on Obligation not to cause significant harm, namely the phrase 'due diligence' was deleted and replaced by

[563] A/CN.4/L.493 and Add.1 [and Add.1/Corr.1] and 2, The law of non-navigational uses of international watercourses. Draft articles and commentaries thereto adopted by the Drafting Committee on second reading: articles 1-33 reproduced in Yearbook…1994, vol. II (Part Two), para. 222,, *Extract from the Yearbook of the International Law Commission*, 1994, Vol. II(2), p. 239. See, also; Rieu-Clarke, Moynihan & Magsig, 2012, p. 176.

[564] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, p. 11.

[565] A/CN.4/412 and Add.1 & 2, The law of non-navigational uses of international watercourses. Draft articles and commentaries thereto adopted by the Drafting Committee on second reading: articles 1-33 reproduced in Yearbook…1994, vol. II (Part Two), para. 222,, *Extract from the Yearbook of the International Law Commission*, 1994, Vol. II(2), p. 240. Moreover, on hazardous substances see: ILA Montreal Rules on Pollution (1982) and Supplemental Rules on Pollution (1996), Art. 26 on Hazardous Substances of the Berlin Rules.

[566] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, p. 11.

the phrase 'to take all appropriate measures'. McCaffrey argues however that "it is merely saying the same thing in different words".[567]

Turning our attention to the obligations, first, the obligation to prevent will be examined. This can be connected to two principles of the international environmental law, or more specifically international water law, namely the preventive principle and the precautionary principle.[571] Interestingly, though the Watercourses Convention refers to the preventive principle, the precautionary principle can be detected merely in the Commentary of the Watercourses Convention; however based on the development of the international water law after the adoption of the Watercourses Convention, it can be declared that the precautionary principle forms part of the customary international law on transboundary water pollution. When it comes to the reference to the precautionary principle, the phrase 'may cause' is worth noting, as stated in the Commentary of the Watercourses Convention, it refers primarily to 'dangerous substances';[572] nonetheless, it may also cover unpredictable negative consequences occurring as a result of the cumulative effects of different kinds of substances,[573] as well as accidental pollutions.[574] This ascertainment that the precautionary principle forms part of the customary international law can be supported, among others, by the Water Convention and the Berlin Rules at universal level, furthermore, by the Water Framework Directive at regional level, not to mention, several bilateral agreements such as the Danube River Protection

[567] S.C. McCaffrey, The UN Convention on the Law of the Non-Navigational Uses of International Watercourses: Prospects and Pitfalls, *in S.M.A. Salman & L. Boisson de Chazournes* (Eds.), *International Watercourses, Enhancing Cooperation and Managing Conflict,* World Bank Technical Paper No. 414, 1997, p. 21.

[571] Interestingly, in the Third report on the law of the non-navigational uses of international watercourses, by
Mr. Stephen M. Schwebel, Special Rapporteur it was mentioned that „As a result, and after fashioning on a trial basis separate articles for pollution and for environment, the article herein proposed comprehends but distinguishes between these related concerns. Naturally, under this topic of the law of the non-navigational uses of international watercourses, all aspects of international environmental law are not treated. In like manner, principles and rules for transnational pollution not water-related are by definition excluded. Traditionally, international water resources law has addressed the problems of pollution, omitting concern for the environment as a whole. Common cause could have been made with the traditional approach, leaving to what has come to be called international environmental law the water-related aspects of environmental regulation. International environmental law generally is in a less codified state, however, than even the law of international watercourses. Since environmental aspects are of real consequence to the rational development, use and protection of shared water resources, principles and rules pertaining to the environment have here been integrated with pollution into one proposed draft article." See: A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 248.

[572] Commentary of the Watercourses Convention, 1994, p. 122.

[573] Tanzi & Arcari, 2001, p. 252.

[574] Mason, 2001, p. 84.

Convention,[575] the Convention on the Protection of the Rhine, [576] the Agreement between the government of Australia and the government of Indonesia concerning administrative arrangements as to the border between Papua New Guinea and Indonesia[577] and the Great Lakes Water Quality Agreement[578] refer to it. While unquestionably both principles are crucial regarding water pollution, as discussed at the beginning of the dissertation we do not have the opportunity to analyse them as part this research; however, interestingly, we will share the approach of the Great Lakes Water Quality Agreement as a recent document between two developed states. Concerning 'prevention', it is stated that "*anticipating and preventing pollution and other threats to the quality of the Waters of the Great Lakes to reduce overall risks to the environment and human health".*[579] Further, regarding 'precaution', it is indicated that by

"incorporating the precautionary approach, as set forth in the Rio Declaration on Environment and Development, the Parties intend that, "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".[580]

In addition, in harmony with the precautionary principle, as indicated in the same agreement between Canada and the US, it can be justified that only zero discharge is acceptable for certain substances.[581]Moreover, some examples can be mentioned to illustrate how the obligation to prevent was adopted by other documents, among others, the "obligation to prevent pollution,"[582] to "prevent its further pollution and to improve its current state,"[583] "preventing further pollution of these waters,"[584] "to prevent the

[575] Annex I, Part2 of the Danube River Protection Convention.
[576] Art. 4(a) of the Convention on the Protection of the Rhine.
[577] Art. 12 of the Agreement between the government of Australia (acting on its own behalf and on behalf of the government of Papua New Guinea) and the government of Indonesia concerning administrative arrangements as to the border between Papua New Guinea and Indonesia, signed on 13 November 1973.
[578] Art. 4(i) of the 2012 Agreement between Canada and the United States on Great Lakes Water Quality Agreement.
[579] Art. 2.4(j) of the Great Lakes Water Quality Agreement.
[580] Art. 2.4(i) of the Great Lakes Water Quality Agreement.
[581] Art. 2.4(p) of the Great Lakes Water Quality Agreement. See: "zero discharge –adopting the philosophy of zero discharge for control of releases of chemicals of mutual concern, as appropriate".
[582] See: Art. 1(1) of Convention on the International Commission for the Protection of the Oder to "prevent the pollution of the Oder and the Stettiner Haff, including their drainage areas". Preamble of Convention on the International Commission for the Protection of the Oder "preventing further pollution of these waters". Art. 2. (a) "to prevent the pollution of the Oder and the Baltic Sea by contaminants and to achieve a sustained reduction in the pollution thereof".
[583] Preamble of 1990 Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe.
[584] Preamble of the 1996 Convention on the International Commission for the Protection of the Oder.

pollution of the Elbe and its drainage area,"[585] to "propose protective measures to prevent water pollution resulting from accidents,"[586] "propose safeguards to prevent and deal with unforeseen pollution incidents, and establish a uniform warning and alert system in the light of experience"[587] as well as "remedying and preventing pollution of boundary rivers".[588]

Second, the obligation to reduce pollution will be explained. As indicted before, it refers to 'existing pollution'. As was the case with the obligation to prevent, we do not have a definition regarding this obligation. However, when it comes to prevention, we could rely on two principles, although the preventive principle is connected to all these obligations. The only source we could identify regarding the obligation to reduce is the Convention on the International Commission for the Protection of the Oder that refers to proposing *"action programmes for the reduction of pollution, especially by contaminants from both municipal and industrial point sources and from non-point sources and other measures including the proposed timescale, cost estimate and possible funding arrangements"*.[589] This provision illustrates well that without an additional obligation, which clarify the achievable goal, or in default of a threshold which determines to what extent it is necessary to lower pollution level, the obligation to reduce can cover a wide range of reduction from a slight reduction in the pollution level to a reduction resulting in a minimum level of pollution. Interestingly, we can mention a couple of examples from documents explicitly referring to the obligation to reduce such as the "reduction of emissions and for measures to reduce pollution from various sources",[590] "prevent and reduce water pollution",[591] and "eliminate or reduce, to the maximum extent practicable".[592]

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[585] Art. 1(1) of 1990 Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe.

[586] Art. 2(1)g) of 1990 Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe.

[587] Art. 2(1)h) of Convention on the International Commission for the Protection of the Oder.

[588] Final Report of the International Joint Commission on the Pollution of the Boundary Waters Reference: Washington-Ottawa, Government Printing Office, Washington, 1918, p. 39.

[589] Art. 2(1)g) of Convention on the International Commission for the Protection of the Oder.

[590] Art. 1(3) of 1990 Convention between the Federal Republic of Germany and the Czech and Slovak Federal Republic and the European Economic Community on the International Commission for the Protection of the Elbe.

[591] Art. 2(1)(k) of Convention on the International Commission for the Protection of the Oder.

[592] Art. 2(1)(c) of the Great Lakes Water Quality Agreement.

Third, the last obligation relating to Article 21(2) will be shortly discussed, namely the obligation to control. In the frame of this short discussion, we will merely refer to the phrasing of the United Nations Institute for Training and Research (UNITAR) that defines *"Pollution control is viewed as the management of this flow to achieve objectives such as the protection of human health, the protection of organisms or populations other than man or the protection of other resources, including the stability of the environment itself"*.[593]

We opted for this source, as we could not find any other attempt to define pollution control. Moving onto the elements of the non-exhaustive list of 'significant harm' indicated in Article 21(2) of the Watercourses Convention,[594] first, "human health or safety" has to be discussed. First and foremost, it is practical to examine to what extent the definition of the World Health Organisation (WHO) on health is applicable or relevant in our case. Based on the approach of the WHO, "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".[595] Although it can be argued that all forms of well-being are influenced by water quality this or that way, but the most direct connection can be observed with the physical well-being, so we will narrow down our examination to this aspect. It is worth starting our analysis with the fact that this paragraph refers to human health instead of human life, which suggests a higher level of protection, as it does not require the threat of human life. Interestingly, lower level of protection, namely the loss of human life can be detected in an earlier draft of the Watercourses Convention, namely Article 10(6) on Environmental protection and pollution that states that

"Unless otherwise provided by agreement among the system States concerned, no State may pollute or permit the pollution of the waters of an international watercourse system in concentrations or combinations that result in loss of human life, or debilitating or disfiguring illness, in the territory of a co-system State. Without prejudice to its responsibility for appreciable harm under article 8 of these articles, in the event that such

[593] UNITAR, International Co-operation for Pollution Control, paper prepared by D. Serwer, Research Reports No. 9, Feb. 1972, p. 1. from A/CN.4/348 and Corr.1, Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 313.

[594] See interestingly, Principle V of the European Water Charter states that "Pollution is a change, generally man-made, in the quality of water which makes it unusable or dangerous for human consumption, industry, agriculture, fishing, recreation, domestic animals and wildlife".

[595] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.

pollution none the less occurs, the polluting system State shall with all deliberate speed abate the pollution to the level necessary to avert the said result".[596]

Further, interestingly, it is worth referring to the commentary of an earlier draft, which states that

"Paragraph 6 expresses the extraordinary concern for the protection of human life and health by proscription of pollution that results in loss of life or health. The paragraph is cast in objective terms. This rule could not be invoked on the basis of speculation that a certain pollution may cause such hazards. On the other hand, it is not necessary that one or more persons die or be beset by disfigurement or debilitating illness. It is intended that it would suffice to show that the kind and rate of the given pollution has caused or will in fact cause the proscribed result, even elsewhere. The paragraph also anticipates that, despite the prohibition (failing an agreement among the States concerned), pollution seriously hazardous to human health and life may occur. Once the deed is done, and above and beyond the question of international responsibility for the harm caused, the polluting State must take speedy action to put an end to the hazard-causing pollution".[597]

Nonetheless, human health may be under threat due to several reasons depending on water uses. Firstly , we have to refer to human water needs relating to the principle of sustainable development, as discussed earlier. In addition, it can be mentioned that WHO recommends using groundwater as the source of drinking water as it is more protected against pollution compared to surface water. This special characteristic of groundwater is mirrored in the Danube River Protection Convention as it is prescribed to *"prevent the pollution of groundwater resources, especially those in a long-term perspective reserved for drinking water supply, in particular caused by nitrates, plant protection agents and pesticides as well as other hazardous substances"*.[598]

Furthermore, an interesting question relating to human health is whether Article 21(2) of the Watercourses Convention refers to an average, adult person or it takes into account the change in the immune system of humans, namely the immune system of a new-born is quite weak that is why they are so vulnerable to pollution; however, later our immune system develops rapidly and in later age the body is once again more susceptible to

[596] A/CN.4/348 and Corr.1., Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), p. 145.
[597] Ibid., para. 327.
[598] Art. 6(b) of Convention on Cooperation for the Protection and Sustainable use of the Danube River.

infection. Additionally, apart from age, other factors such as the individual's level of nutrition, stress or pregnancy play an important role relating to water quality.[599]

After examining human health, we will turn our attention to 'human safety' and share the major concerns relating to it. First, the relationship between water and food security has to be mentioned, as agriculture accounts for 70 per cent of all water consumption worldwide; however, the relationship between food security and water quality cannot be overemphasised, as only water with sufficient quality can be used. Consequently, water is linked to food security from both quantitative and qualitative perspectives.[600] Second, water as a weapon has to be mentioned. relating to safety. Interestingly, both the quantitative and qualitative aspects of water play an important role in this sense. Concerning water quantity, two extreme cases, namely the drastic reduction of the water flow as well as the human-created floods can be mentioned. However, from our research point of view the qualitative aspect has to be highlighted, namely the pollution and poisoning of waters as military tool.[601] Nonetheless, it is difficult to elucidate this latter case in a transboundary context thanks to its invaluable character of water for states. Probably, with the exception of those incidents when the poison enters into the water very close to the border. However, even in this case states cannot ignore that due to the relationship between surface and groundwater they can harm themselves seriously, if either their groundwater or their surface water supply becomes polluted. Third, we have shortly referred to climate change relating to the allocation of water on Earth. This time we have to reaffirm that climate change negatively affects water quality as well, thereby, increasing tensions can be expected for water that may exacerbate conflicts between and within states and present threat for international security.[603] Finally, relating to living resources, it is worth noting that 'Living' natural resources are 'renewable'(...) and living species though in principle capable of reproduction and, in that sense, 'renewable', are in certain circumstances indeed susceptible of depletion, exhaustion and extinction, frequently because of human activities. Living resources are just as 'finite' as petroleum,

[599] Emerging issues in water and infectious disease, World Health Organization, 2003, p. 15.
[600] D.K. Kraemer, 'The Past, Present, and Future of Water Conflict and International Security', *Journal of Contemporary Water Research & Education*, Vol. 149, 2012, p. 88.
[601] Ibid., p. 89.
[603] Kraemer, 2012, p. 87.; P.H. Gleick & M. Heberger, 'Water and Conflict: Events, Trends, and Analysis' 2011-2012, p. 159 <worldwater.org>; E. Weinthal, 'Water Climate Change, and Human Security' pp. 77-84. <strategiesinstitute.army.mil>

iron ore and other non-living resources.[604] In case of freshwaters fish can be the most important natural resources, which follows from the number of fishery agreements.
Finally, the second part of Article 21(2) obliges States to "take steps to harmonize their policies in this connection". Not surprisingly, the Commentary of the Watercourses Convention identifies this paragraph as a 'specific application' of the two general principles, namely equitable and reasonable utilization and the obligation not to cause significant harm.[605]

3.5.3. Article 21(3) the Obligation to Consult

Moving onto paragraph 3, it establishes the obligation to "consult with a view to arriving at mutually agreeable measures and methods" in order to, as was the case in Article 21(2), "prevent, reduce and control the pollution of an international watercourse". Three groups of 'measures and methods' are specified, such as joint water quality objectives, the establishment of techniques and practices against pollution from point and non-point sources and finally, the establishment of lists of substances, the introduction of which into the international watercourse is "prohibited, limited, investigated or monitored". This paragraph requires some explanations. First, in harmony with its framework character, there is no reference to the required level of water quality, which should be reached through these obligations, or to the 'measures and methods'. This can be explained with the varying water quality all over the world and the differences in the economic development; however, as mentioned above, special attention has to be paid to the release of hazardous substances. Furthermore, as mentioned before, the significant pollution harm is tolerable only in that case when the "State of origin is making its best efforts to reduce the pollution to a mutually acceptable level".[606] Second, the establishment of the list of substances mirrors a shift from the earlier differentiation between 'existing' and 'new' pollution to the contemporary classification of substances into 'black' ("for the most threatening or toxic contaminants") and 'grey' (for the less threatening or toxic contaminants "meriting monitoring and control") list, which is an 'appropriate' solution for a framework convention.[607]

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[604] WTO Analytical Index: Guide to WTO law and practice, 2nd ed first volume Cambridege p. 277.
[605] Commentary of the Watercourses Convention, 1994, p. 122.
[606] Ibid.
[607] A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), p. 240.

3.6. The Water Convention

After a detailed analysis of water pollution in the realm of the Watercourses Convention, we now turn our attention to the Water Convention. As mentioned before, contrary to the Watercourses Convention, the Water Convention provides no definition of water pollution, although it opted for using this term. Therefore, its precise meaning will be revealed, firstly, by identifying where the term 'pollution' can be detected in the text and how it can be interpreted in light of the Watercourses Convention's pollution definition. Secondly, it will be analysed based on the relevant provisions of other UNECE environmental agreements. However, before starting this examination, some remarks about the terms 'transboundary impact' and 'ecosystem' in the Water Convention must be made.

3.6.1. Provisions concerning 'ecosystem'

Moving onto the relevant provisions of the Water Convention, one can easily identify that contrary to the Watercourses Convention, the Water Convention encompasses only short references to the ecosystem, not to mention that these are not connected to the obligations to protect and preserve. Nonetheless, they are also not absolute ones.[608] Not surprisingly, the obligation to protect can be discovered several times in the text, among others in connection with the environment.[609] Indeed, as stated in the Water Convention, "The Parties shall, in particular, take all appropriate measures (…) To ensure conservation and, where necessary, restoration of ecosystems".[610] Furthermore, "Stricter requirements, even leading to prohibition in individual cases, are imposed when the quality of the receiving water or the ecosystem so requires" as well as "Sustainable water-resources management, including the application of the ecosystems approach, is promoted".[611] Two observations can be made relating to these provisions. On the one hand, the fact that their

[608] Convention on the Protection and Use of Transboundary Watercourses and International Lakes, adopted in Helsinki on 17 March 1992, Art. 2(d) states that „The Parties shall, in particular, take all appropriate measures to ensure conservation and, where necessary, restoration of ecosystems." Art. 3.1 states To prevent, control and reduce transboundary impact, the Parties shall develop, adopt, implement and, as far as possible, render compatible relevant legal, administrative, economic, financial and technical measures, in order to ensure, inter alia, that: (d) „stricter requirements, even leading to prohibition in individual cases, are imposed when the quality of the receiving water or the ecosystem so requires" and (i) sustainable water-resources management, including the application of the ecosystems approach, is promoted."

[609] Art. 2.2(b) of Water Convention refers to the "environmental protection"; Art. 2.6. of the Water Convention refers to "the protection of the environment of transboundary waters or the environment influenced by such waters, including the marine environment".

[610] Art. 2.2.d. of the Water Convention.

[611] Art. 3.1.(d) and (i) of the Water Convention.

significance should not be underestimated just because they do not constitute a unified article and are not located at a privileged or symbolic place as was the case with the Watercourses Convention. On the other hand, it is also conspicuous that more specific requirements are mentioned relating to the ecosystem protection in the Water Convention compared to the Watercourses Convention.

3.6.2. The 'Transboundary Impact', as the Basic Concept of the Water Convention

In analysing the basic concept of the Water Convention, it is worth noting that the term 'transboundary impact'was adopted during the second special session of the Working Party on Water Problems and remained unchanged.[612] Article 1(2) of the Water Convention defines it as

"any significant adverse effect on the environment resulting from a change in the conditions of transboundary waters caused by a human activity, the physical origin of which is situated wholly or in part within an area under the jurisdiction of a Party, within an area under the jurisdiction of another Party. Such effects on the environment include effects on human health and safety, flora, fauna, soil, air, water, climate, landscape and historical monuments or other physical structures or the interaction among these factors; they also include effects on the cultural heritage or socio-economic conditions resulting from alterations to those factors".[613]

Focusing on the most relevant elements from the current research point of view, first and foremost, it has to be mentioned that this concept is much broader than the term 'pollution', since it covers all forms of 'transboundary impact' causing 'significant adverse effect', therefore, water pollution is only one such possible impact, albeit, judging by the text of the Water Convention definitely the most important one. Secondly, Article 2(1) of the Water Convention stipulates the obligations to "prevent, reduce and control any transboundary impact", similarly to Article 194 of UNCLOS and Article 21(2) of the Watercourses Convention. Thirdly, the term 'significant adverse effect' serves as a threshold, similarly to 'significant harm' in the Watercourses Convention, however, the Water Convention provides a more detailed, even if non-exhaustive list of these effects.

[612] Rieu-Clarke, 2015, p.13.

[613] Art. 1(2) of the Cartagena Convention. Interestingly. see: Acceptable levels of acidifying pollutants, ozone and PM are determined to protect materials and cultural heritage in accordance with the Convention's Manual on Methodologies and Criteria for Modelling and Mapping Critical Loads and Levels and Air Pollution Effects, Risks and Trends.

Moreover, the term 'human conduct' was adopted in order to differentiate between natural and anthropogenic effects; however, contrary to the Watercourses Convention it does not cover omissions. Finally, it can be concluded that despite the more comprehensive approach of the Water Convention adopting the concept of 'transboundary impact', several similarities can be recognized with Article 21 of the Watercourses Convention.

In addition, we have to refer to adoption of the Protocol on Water and Health, as health forms part of the definition of 'transboundary impact'. "The objective of this Protocol is to promote at all appropriate levels, nationally as well as in transboundary and international contexts, the

"protection of human health and well-being, both individual and collective, within a framework of sustainable development, through improving water management, including the protection of water ecosystems, and through preventing, controlling and reducing water-related disease".[614]

Moreover, *"The Parties shall take all appropriate measures to prevent, control and reduce water-related disease within a framework of integrated water-management systems aimed at sustainable use of water resources, ambient water quality which does not endanger human health, and protection of water ecosystems".*[615]

3.7. The Term 'Pollution' in the Water Convention

After skimming through the Water Convention, it is clear that the term 'pollution' is repeated several times, among others, in the Preamble, in Article 2 and Article 3, as well as in other parts of the Water Convention.

3.7.1. The Preamble of the Water Convention

As for the term 'pollution' enshrined in the Preamble, it is referred to both explicitly (such as, 'pollution of the marine environment' and "to prevent, reduce and control of transboundary water pollution") and implicitly (for example 'threats of adverse effects', to "prevent, control and reduce the release of the hazardous substances into the aquatic environment" or 'sustainable water management').

[614] Art. 1 of Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

[615] Art. 4.1. of Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes.

3.7.2. Article 2 on General Provisions

Article 2(1) on General Provisions stipulates that "The Parties shall take all appropriate measures to prevent, control and reduce any transboundary impact." Not only does this definition reiterate the obligations relating to water pollution in Article 21(2) of the Watercourses Convention; it also repeats the same obligations relating to water pollution in the Preamble of the Water Convention.[616]

The following paragraph, namely Article 2(2) prescribes that Parties "take all appropriate measures", included but not limited to, first and foremost "to prevent, control and reduce pollution of waters causing or likely to cause transboundary impact". Starting with the phrase "take all appropriate measures", similarly to the Watercourses Convention, one can promptly recall that it refers to the 'due diligence' nature of these obligations, which is also confirmed in the Guide to Implementing The Water Convention.[617] Moving onto the expression 'likely to cause', it can be paralleled by the phrase 'may cause' in Article 21(2) of the Watercourses Convention, as both of them contain the precautionary principle – referred to in Part I as a 'guiding principle', while taking the measures of Article 2(1) and (2) of the Water Convention.[618] In addition, other obligations stipulated in this paragraph referring to water uses also include water quality, such as "ecologically sound and rational water management" as well as the 'reasonable and equitable' use of transboundary waters. Moreover, the obligation to "ensure conservation [...] and restoration of ecosystem" is also inseparable from satisfactory water quality. Finally, it is worth mentioning the "measures for the prevention, control and reduction of water pollution shall be taken, where possible, at source".[619]

Moving onto Article 2(5) of the Water Convention, which contains the principles relating to measures set forth in Article 2(1) and in Article 2(2), we may determine that all of them are strongly connected to water quality. Firstly, the precautionary principle is mentioned, with special regard to the hazardous substances,[620] similar to the Watercourses

[616] See, also; Provision 1 of the United Nations Economic Commission for Europe, *Model Provisions on Transboundary Groundwaters*, United Nations, New York, Geneva, 2014, p. 5.
[617] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, pp. 10-12.
[618] Art. 2.5.(a) of the Water Convention.
[619] Ibid Art. 2.3.
[620] Ibid Art. 5. a) of the Water Convention. On the precautionary principle in the Hungarian Law see; L. Fodor, *Környezetjog,* Debrecen University Press, Debrecen, 2014, pp. 86-88.

Convention.[621] It is worth noting, that in the text of the Watercourses Convention hazardous substances are only mentioned implicitly, while explicit references can be found in the commentaries of its previous drafts. However, the Water Convention not only explicitly refers to them, but it also provides a definition, namely 'hazardous substances' are "toxic, carcinogenic, mutagenic, teratogenic or bio-accumulative, especially when they are persistent".[622] Secondly, the polluter-pays principle should be mentioned, which can be connected, first and foremost, to the polluter and, this way, to the pollution.[623] Thirdly, the concept of sustainability can be identified in connection with the management of water resources,[624] which definitely covers both the quantitative and the qualitative aspect of water.

3.7.3. Article 3 on Prevention, Control and Reduction

Turning our attention to Article 3 on Prevention, Control and Reduction, as is apparent, it covers a non-exhaustive list of "legal, administrative, economic, financial and technical measures". Taking a look at these measures, one can find some general considerations relating to water pollution. Firstly, similarly to the Watercourses Convention,[625] this article differentiates between point and diffuse sources of pollution,[626] moreover, the main sources of pollution are identified, namely industrial, municipal as well as agricultural pollution.[627] Furthermore, special attention is paid to hazardous substances[628] as well as accidental pollution.[629] Secondly, it is clear that several provisions constitute the special application of the aforementioned principles guiding these measures, and shared by the Watercourses Convention, such as the precautionary principle and the sustainable development. These principles can be identified in the obligation to prevent at source by using low-and non-waste technology,[630] in the application of the best available technology for discharges of hazardous substances,[631] in the reference to

[621] Commentary of the Watercourses Convention, 1994, p. 122
[622] Art. 1(6) of the Water Convention.
[623] See; Recommendation of the Council on Guiding Principles concerning International Economic Aspects of Environmental Policies, C(72)128, OECD, 1972; The Polluter-Pays Principle, OECD Analyses and Recommendations, OCDE/GD(92)81, Organisation for Economic Co-operation and Development, Paris, 1992.
[624] Art. 2(5) c) of the Water Convention.
[625] Art. 21(3) b) of the Watercourses Convention.
[626] Art. 3.1. (b) and Art. 3.1. g) of the Water Convention.
[627] Ibid. Art. 3.1. e), f) and g).
[628] Ibid. Art. 3.1. c).
[629] Ibid. Art. 3.1. l).
[630] Ibid. Art. 3.1. a).
[631] Ibid. Art. 3.1. c).

environmental impact assessment[632] as well as in the application of "stricter requirements [...] when the quality of the receiving water or ecosystem so requires,[633] not to mention the minimization of accidental pollution.[634] Additionally, special problems such as challenges imposed by nutrients are also addressed.[635]

3.7.4. Other Provisions Referring to Water Pollution

Besides Article 2 and 3 of the Water Convention, numerous other articles include provisions relating to water quality, among others, Article 5 on Research and Development, Article 9 on Bilateral and Multilateral Cooperation and Article 11 on Joint Monitoring and Assessment. Finally, the significance of the Annexes cannot be overemphasized. First and foremost, Annex III on Guidelines for Developing Water-quality Objectives and Criteria must be stressed, which gives a detailed description of the requirements relating water quality criteria, at the same time, it can also serve as a guideline while 'setting joint water quality objectives and criteria' under Article 21(3)c) of the Watercourses Convention. Secondly, Annex I on Best Available Technology and Annex II on Best Environmental Practices are inseparable from Article 21(3)b), as their applications are the most typical way to address point and non-point pollution. Consequently, we can state that Article 3 of the Water Convention can fill out the lacunae of Article 21(3) of the Watercourses Convention.

3.8. The Relationship between the Water Convention and the other UNECE Environmental Conventions

Besides the provisions of the Water Convention, as mentioned above, it is worth taking a look at the other environmental conventions adopted under the auspices of the UNECE, as "Water Convention is an integral part of a wider legal framework in the UNECE region constituted by five environmental conventions".[636] The Convention is "both complemented by and contributes to the implementation of the other UNECE conventions. The Water Convention benefits from the work carried out under these instruments, since there is significant synergy in terms of their substantive scopes,

[632] Ibid. Art. 3.1. h).
[633] Ibid. Art. 3.1. d).
[634] Ibid. Art. 3.1. l).
[635] Ibid. Art. 3.1. f) and g).
[636] United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *Guide to Implementing The Water Convention*, (ECE/MP.WAT/39), United Nations, New York, Geneva, 2013, para. 5.

obligations and commitments".[637] After a careful analysis of the UNECE environmental conventions, two of them deserve some remarks on water pollution, namely the 1979 Convention on Long-range Transboundary Air Pollution[638] and the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention).[639] While in the former case the definition of air pollution deserves attention, in the latter convention the term 'transboundary impact' is of particular interest.

3.8.1. The Convention on Long-range Transboundary Air Pollution

Starting with the 1979 Convention on Long-range Transboundary Air Pollution, it defines 'air pollution' as

"*introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property and impair or interfere with amenities and other legitimate uses of the environment, and "air pollutants" shall be construed accordingly*".[640]

One can easily compare this definition without a detailed analysis with the Watercourses Convention and recognize that the main elements of this definition either explicitly or implicitly coincide with the definition laid down in Article 21(1) of the Watercourses Convention. Even though the current definition defines the exact means (such as 'introduction') and sources (such as 'substances or energy'), as indicated in the commentary to an earlier draft of the Watercourses Convention, this is merely a question of approach.[641]Moreover, the term 'deleterious effect' can be accepted as a synonym of 'detrimental effect' referring to the threshold. Finally, one can observe that the definition on pollution in the Convention on Long-range Transboundary Air Pollution, similarly to the Water Convention, overlaps with the Watercourses Convention, but covers a wider range of effects.

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[637] Ibid.

[638] 1979 Convention on Long-range Transboundary Air Pollution, signed in Geneva on 13 November 1979 and entered into force 16 March 1983. https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-1&chapter=27&lang=en

[639] Convention on Environmental Impact Assessment in a Transboundary Context, adopted in Espoo on 25 February 1991 and entered into force 10 September 1997.

[640] Art. 1(a) of the 1979 Convention on Long-range Transboundary Air Pollution.

[641] A/CN.4/412 and Add.1 & 2, Fourth report on the law of the non-navigational uses of international watercourses, by Mr. Stephen C. McCaffrey, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1988, Vol. II(1), p. 237.

3.8.2. Espoo Convention on Environmental Impact Assessment

Moving onto the Espoo Convention, Article 1 defines 'transboundary impact' as "*any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party*".[642]

After comparing the definition of 'transboundary impact' in the Water Convention with the definition in the Espoo Convention, two remarks must be made. On the one hand, one can observe that the definition of the Espoo Convention is as broad as the definition enshrined in the Water Convention; however, contrary to the Espoo Convention, the Water Convention does not explicitly exclude impacts of 'global nature', such as the impact on the marine environment.[643] On the other hand, compared to the Espoo Convention, the wording of the Water Convention is more 'restrictive', as only "adverse significant effect on the environment" is covered by the latter.[644] In addition, Appendix I of the Espoo Convention lists several activities, which are likely to cause a significant adverse transboundary impact also on water quality, such as, among others, waste disposal installations, groundwater abstraction as well as pulp and paper manufacturing.

[642] Art. 1. (viii.) of the Convention on Environmental Impact Assessment in a Transboundary Context.
[643] The Relationship between the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 25 February 1991) and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 17 March 1992) p. 8.
[644] Ibid.

4. Pollution of the marine environment and marine pollution from land-based sources

This chapter focuses on the pollution of the marine environment. First, the adoption of the UNCLOS will be shortly discussed, followed by the analysis of Article 192 of the UNCLOS on Protection and preservation of the Marine Environment and the examination of the same obligations in the Regional Seas Conventions. Second, the definition of the marine environment was analysed as well as Article 1(4) of the UNCLOS relating to the pollution of the marine environment. Then, Article 194(1) on Measures to prevent, reduce and control pollution of the marine environment. Finally, we will explore the intersection between the pollution of the international watercourses and the pollution of the marine environment. As such, the land-based marine pollution via watercourses will be examined.

4.1. The adoption of the UNCLOS

First and foremost, it has to be pointed out that the aim of the international community with the adoption of the Third United Nations Convention on the Law of the Sea (UNCLOS) was to adopt new comprehensive set of rules concerning the sea, as Geneva Conventions on the Law of the Sea[645] (UNCLOS I) and the Second United Nations Conference on the Law of the Sea (UNCLOS II) proved to be 'inadequate' to tackle with several challenges. Starting with UNCLOS I, on 29 April 1958, four conventions and an optional protocol were opened for signature, namely the Convention on the Territorial Sea and the Contiguous Zone (CTS), the Convention on the High Seas (CHS), the Convention on Fishing and Conservation of the Living Resources of the High Seas (CFCLR), the Convention on the Continental Shelf (CCS) and the Optional Protocol of Signature concerning the Compulsory Settlement of Disputes (OPSD).[646] The aim of the (first) United Nations Conference on the Law of the Sea taking place in Geneva from 24 February to 27 April 1958 was to

"*examine the law of the sea, taking account not only of the legal, but also of the technical, biological, economic and political aspects of the problem, and to embody the results of*

[645] UNCLOS I, adopted in Geneva on 29 April 1958.
[646] http://legal.un.org/avl/ha/gclos/gclos.html

its work in one or more international conventions or such other instruments as it may deem appropriate";[647]

however, it failed to produce one instrument relating to law of the sea.[648] Moving onto UNCLOS II, the second conference took place in Geneva from 17 March to 26 April 1960and resulted in the adoption of two resolutions.[649] Concerning UNCLOS I and UNCLOS II, the Preamble of the UNCLOS states that the *"United Nations Conferences on the Law of the Sea held at Geneva in 1958 and 1960 have accentuated the need for a new and generally acceptable Convention on the law of the sea"*.[650] The UNCLOS, also known as the "constitution of the oceans," consists of 17 parts, 320 articles and 9 annexes. It was opened for signature in Montego Bay on 10 December 1982 and entered into force on 14 November 1994. UNCLOS has currently 168 Contracting Parties.

4.2. Article 192 of the UNCLOS on Protection and Preservation of the Marine Environment

First, some general remarks will be made relating to Article 192 of the UNCLOS, followed by examining the protection and the preservation of the ecosystem in Regional Seas Conventions as well as in their protocols on land-based sources of marine pollution including marine and coastal ecosystem as well as rare, fragile and vulnerable ecosystem.

4.2.1. General remarks on the protection and preservation of the marine environment in the UNCLOS

Article 192 of the UNCLOS on General Obligations stipulates that "States have the obligation to protect and preserve the marine environment".[651]

Embarking upon some general remarks concerning the *travaux préparatoires* of this article, first, it can be observed that exactly the same phrasing can be detected in the vast

[647] Resolution 1105 (XI) of the General Assembly of the United Nations Convening the Conference.
[648] http://legal.un.org/avl/ha/gclos/gclos.html
[649] A/CONF.19/L.15, Final Act of the Second United Nations Conference on the Law of the Sea.
[650] Preamble of the UNCLOS.
[651] See, interestingly: L. Fodor, A CO2 leválasztásának és tárolásának (CCS) nemzetközi vetületei *in* A. Raisz Anikó (Ed.), *A nemzetközi környezetjog aktuális kihívásai*, Miskolci Egyetem, Miskolc, 2012. pp. 51-61.

majority of draft versions relating to this article during the negotiations of the UNCLOS.[652]

Second, interestingly, as stipulated in one of the drafts of Article 192 of the UNCLOS, "States have the obligation to protect and preserve all the marine environment".[653] As can be seen, this wording encompasses an additional 'all' relating to the marine environment that may serve the purpose of emphasising that the entirety of the marine environment is covered by this article. However, it can be argued that it is highly unlikely that it would bear with any relevance concerning the obligations under Article 192 of the UNCLOS, this can be supported by the fact that the word 'all' was later dropped.

Third, it is worth referring to another draft of Article 192 of the UNCLOS, which declared that

"States and the Authority have the obligation to protect and preserve the quality and the resources of the marine environment in accordance with the provisions of these articles".[654]

This phrasing added, among others, the terms 'quality' and 'resources' relating to 'marine environment'.[655] On the one hand, the aim of the explicit reference to the water quality may be attributable to the fact that unlike in case of freshwater, the availability of sea water is practically unlimited, so merely the water quality can trigger concerns. However, water quality is strongly related to the legitimate uses of sea such as fishery or coastal tourism. One can promptly recall, based on our examination relating to the Watercourses Convention, that the term 'quality' refers to the essential nature and degree of purity of water"[656] or in other words, "to the physical, chemical and biological characteristics of water". In sum, polluted water has more 'negative qualities' than positive ones.[657] On the other hand, the word 'resources' can be determined as "all solid, liquid or gaseous mineral

[652] See also: Art. 1 of A/CONF.62/C.3/L.6, Canada, Fiji, Ghana, Guyana, Iceland, India, Iran, New Zealand, Philippines and Spain: draft articles on a zonal approach to the preservation of the marine environment; Art. 192 of A/CONF.62/L.78, Draft convention on the law of the sea; A /CONF. 62/WP. 8/PART III, (Text presented by the Chairman of the Third Committee.); Art. 192 of A/CONF.62/L.78*, Draft convention on the law of the sea.
[653] Art. 2 of A /CONF. 62/WP. 8/PART III, (Text presented by the Chairman of the Third Committee).
[654] Art. 3 of A/CONF.62/C.1/L.3, Draft articles considered by the Committee at its informal meetings (Articles 1-21).
[655] Remark: As from the current research point of view the other words are not relevant, we do not wish to devote any attention to them.
[656] Commentary of the Watercourses Convention, pp. 121-122.
[657] S.K. Agarwal, *Water Pollution*, A.P.H. Publishing Corp., New Delhi, 2005, p. 37.

resources in situ in the Area at or beneath the seabed, including polymetallic nodules".[658] Additionally, it is worth noting that "resources, when recovered from the Area, are referred to as "minerals".[659]

Moreover, before discussing the exact meaning of Article 192 of the UNCLOS, it is worth recalling some ascertainments concerning Article 20 of the Watercourses Convention on the Protection and preservation of ecosystems that declares that "Watercourse States shall, individually and, where appropriate, jointly, protect and preserve the ecosystems of international watercourses".

First and foremost, as mentioned before, Article 20 of the Watercourses Convention was modelled on Article 192 of UNCLOS on General obligation. Despite being a model of Article 20 of the Watercourses Convention, as can be seen, the scope of the two articles does not completely coincide. As discussed earlier concerning Article 20 of the Watercourses Convention, it refers to the protection and preservation of the 'ecosystem,' whereas the UNCLOS refers to the 'marine environment'. In this sense, it is worth reaffirming, on the one hand, that the term 'environment' is broader than the term 'ecosystem'. On the other hand, that the term 'environment' includes but not limited to 'marine environment'. Consequently, the difference in the scope of the two conventions is not merely attributable to the fact that one regulates freshwaters, whereas the other one the sea water (if we oversimplify the situation) or one regulates 'international watercourses,' whereas the UNCLOS covers the 'Area' (if we want to be more precise). This situation encourages us to examine both terms, namely the 'ecosystem' and the 'marine environment' in the UNCLOS.

So, we will continue our previous train of thought with the term 'ecosystem' that is explicitly and exclusively mentioned in Article 194(5) of the UNCLOS, as it stipulates that

"The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life".[660]

In other words, on the one hand, as was the case with Article 192 of the UNCLOS, Article 194(5) of the UNCLOS also prescribes the obligation "to protect and preserve", so in this

[658] Art. 133 (a) of the UNCLOS.
[659] Art. 133 (b) of the UNCLOS.
[660] The agreement on the adaption of this new paragraph was reached on the 38th meeting of the Third Committee. See A/CONF.62/C.3/SR.38, 38th meeting of the Third Committee, p. 158.

sense there is no difference between them. On the other hand, the scope of this article is limited to special types of ecosystems, namely "rare or fragile ecosystems".

Armed with this information, first, we will examine the obligation to protect and preserve the ecosystem in Regional Seas Conventions as well as in their protocols on land-based sources of marine pollution. Second, we will make an attempt to find out the meaning of marine environment.

4.2.2. The protection and the preservation of the ecosystem in the Regional Seas Conventions

Before discussing how the Regional Sea Conventions as well as their protocols on land-based sources of marine pollution refer to the protection and the preservation of the ecosystem, it is worth mentioning some characteristics of the ecosystem. We have discussed some characteristics of the ecosystem relating to Article 20 of the Watercourses Conventions. Those statements are also applicable to Article 192 of the UNCLOS; however, they can be supplemented by other ascerntainments based on the Regional Seas Conventions. Among others, Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran Convention)[661] confirms the dynamic character of the ecosystem;[662] furthermore, several conventions such as Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua Convention)[663] and The Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment (Jeddah Convention)[664] refer to the integrity of the ecosystem. Moreover, it cannot be skipped that the integrated ecosystem approach forms part of the OSPAR

[661] Framework Convention for the Protection of the Marine Environment of the Caspian Sea, adopted in Tehran in Tehran on 4 November 2003 and entered into force on 12 August 2006. Contracting Parties are: Republic of Azerbaijan, Islamic Republic of Iran, Republic of Kazakhstan, Russian Federation and Turkmenistan.

[662] Art. 20 (g) of the Tehran Convention.

[663] Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua Convention), adopted in 18 February 2002. Contracting Parties are Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama. Art. 10(1) of the Antigua Convention states that "Art. 10(1) As part of the implementation of their policies and strategies for integrated management and sustainable development of the marine and coastal environment, the Contracting Parties shall incorporate into their economic development projects in marine and coastal areas those environmental criteria that provide sustainability in the use of resources and in the maintenance of the integrity of ecosystems".

[664] Art. 2 of Jeddah Convention. The Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment (Jeddah Convention), adopted in Jeddah from 13 to 15 February 1982 and entered into force on 20 August 1985. Contracting parties are Djibouti, Egypt, Jordan, Saudi Arabia, Somalia and Sudan.

Convention,[665]which refers to the Convention on Biological Diversity[666] concerning the 'ecosystem'.[667] Interestingly, it is also noteworthy that Antigua Convention opted for using the ecosystem approach only in fisheries management measures.[668]

4.2.2.1. Protection and preservation of ecosystem in general

Starting with the examination of protection and preservation of ecosystem, the provisions referring to 'ecosystem' will be discussed in general without any further specifications.[669] First, Article 6 of the Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities will be mentioned that declares that *"the Contracting Parties shall progressively formulate and adopt, in cooperation with competent international organisations, common guidelines and, as appropriate, standards or criteria dealing in particular with (...) The quality of sea-water used for specific purposes that is necessary for the protection of human health, living resources and ecosystems"*.[670]

Consequently, as can be seen, the protection of the ecosystem plays an important role in determining water quality standards; nonetheless, this provision is only applicable to "sea-water used for specific purposes", so it does not aim to cover all water and all 'ecosystems' accordingly.

Second, three provisions of the Tehran Convention have to be highlighted concerning the 'ecosystem'. Starting with Article 7 of the Tehran Convention, it stipulates that *"The Contracting Parties shall co-operate in the development of protocols to this Convention prescribing additional measures for prevention, reduction and control of pollution of the Caspian Sea from landbased sources. Such protocols may include, inter*

[665] Art. 3(1)b)iv) of Annex V on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area of the OSPAR Convention.
[666] To date, it has 196 Contracting Parties.
[667] Art. 1 of Annex V on the Protection and Conservation of Ecosystems and Biological Diversity of the Maritime Area of the OSPAR Convention.
[668] Art. 10(2) e) of Antigua Convention.
[669] Art. 6(1) c) of the Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities; Art.1., Art. 7(2) d), Art. 11(2), Art. 12 of Tehran Convention; Art. 20 (g) of the Tehran Convention; Preamble and Art. 6(2) (c) of Antigua Convention; Art. 2, Art. 3(1)b)i) and c) of Annex V on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area of the OSPAR Convention; Art. 11 of Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, Protocol concerning Co-operation in Combating Pollution in Cases of Emergency; Art. 3. (xiii) and Art. 13(1) (c) and (2) of [669] Annex I of Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region.
[670] Art. 6(1) c) of the Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities.

alia, the following measures (…) requirements stricter than those provided in sub-paragraphs (b) and (c) of this Article, are imposed according to additional protocols to this Convention when the quality of the receiving water or the affected ecosystem of the Caspian Sea so requires".[671]

This provision expresses the significance of ecosystem protection by using it as one of the factors to apply stricter requirements in order to prevent, reduce and control pollution if it is justified by either "quality of the receiving water or the affected ecosystem". Turning our attention to Article 11 of the Tehran Convention, we can see that it illustrates the relationship between the water fluctuation and its impact on the ecosystem, as it states that

"The Contracting Parties shall take all appropriate measures to reduce the possible negative impact of anthropogenic activities aimed at mitigating the consequences of the sea-level fluctuations on the Caspian Sea ecosystem".[672]

It is worth noting that this provision includes but not limited to the relationship between water quantity and quality, as merely the change in the available water quantity can be sufficient to negatively affect the ecosystem without having any impact on water quality. In addition, naturally, this provision concerns only man-made activities and their impact on ecosystem.

Finally, it is worth paying attention to Article 12 of the Tehran Convention on Prevention of Introduction, Control and Combatting of Invasive Alien Species that states that

"The Contracting Parties shall take all appropriate measures to prevent the introduction into the Caspian Sea and to control and combat invasive alien species, which threaten ecosystems, habitats or species".[673]

When it comes to this provision, we cannot skip to refer to Article 22 of the Watercourses Convention on Introduction of alien or new species although the scope of the said article of the Watercourses Convention is different from two perspectives. On the one hand, Article 12 of the Tehran Convention does not refer to 'new' species; on the other hand, it does not cover all but 'invasive' species. Moreover, UNCLOS also devoted an article,

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[671] Art. 7(2) d) of the Tehran Convention. In addition, Art. 7(2) b) of the Tehran Convention states "the pollution from land-based point sources is prevented, reduced and controlled through licensing of waste-water discharges by competent national authorities of the Contracting Parties" and Art. 7(2) c) of the Tehran Convention stipulates that "licensing of waste-water discharges is based on promoting the use of environmentally sound technology".

[672] Art. 11(2) of the Tehran Convention.

[673] Art.1 of the Tehran Convention defines 'invasive alien species' as "an alien species whose establishment and spread may cause economic or environmental damage to the ecosystems or biological resources of the Caspian Sea".

namely Article 196 on Use of technologies or introduction of alien or new species for this topic. The problems caused by the introduction of invasive alien species have been widely discussed in the scientific literature and it can be summarised that it is mainly connected to the discharge of the ballast water of the ships.[674]

In addition, two types of areas have to be shortly discussed relating to 'ecosystem', namely hot spots and sensitive areas.

Embarking upon 'hot spots', three documents have to be referred, namely the Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities, the Amended Nairobi Convention for the Protection, Management, Development of the Marine and Coastal Environment of the Western Indian Ocean and the Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region.

First, 'hot spot' is defined as

"a limited and definable local land area, stretch of surface water or specific aquifer that is subject to excessive pollution and necessitates priority attention in order to prevent or reduce the actual or potential adverse impacts on human health, ecosystems or natural resources and amenities of economic importance".[675]

Second, 'hot spot' is stipulated as

"a geographically defined marine or coastal area or other areas of the sea, of national, regional or international significance, whose conditions are such as to adversely affect human health, threaten the functioning of ecosystems and biological diversity or degrade

[674] J.L. Molnar, R.L. Gamboa & C. Revenga et al., 'Assessing the global threat of invasive species to marine biodiversity', *Frontiers in Ecology*, Vol. 6, No. 9, 2008, pp. 485–492.; C. Costello, J.M. Drake & D.M. Lodge,' Evaluating an invasive species policy: ballast water exchange in the Great Lakes', *Ecological Applications* , Vol. 17, No. 3, 2007, pp. 655-662. X. Bai, Z. Zhang & M. Bai et al., 'Killing of Invasive Species of Ship's Ballast Water in 20t/h System Using Hydroxyl Radicals', *Plasma Chemistry and Plasma Processing*, Vol. 25, No. 1, 2005, pp 41–54.; N. Baxa, A. Williamsona & M. Aguero et al., 'Marine invasive alien species: a threat to global biodiversity', *Marine Policy*, Vol. 27, No. 4, pp. 313–323. See also: Art. 3(2) of the Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species: 'invasive alien species' means an alien species whose introduction or spread has been found to threaten or adversely impact upon biodiversity and related ecosystem services.

[675] Art. 2 of Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities.

resources and amenities of economic and social importance in a manner that warrants priority management attention".[676]

Third, 'hot spot' is determined as

"a geographically defined coastal or marine area where the level of pollution is such as to affect human health, biodiversity, ecosystems goods and services production, economy or human welfare, and for which priority intervention and management effort is required in order to reduce the level of pollution and inputs of pollutants".[677]

Based on these definitions, the characteristic of the hot spots can be summarised in the following way. Concerning the territorial scope of these definitions, it can be observed that the scope of the hot spots is unified that way that it is limited to 'geographically defined' areas; however, differences can be also recognized in that sense whether or not certain areas are covered, namely merely marine or coastal waters are covered or land and aquifer are also included. In addition, references can be found to area with "national, regional or international significance" that further narrow down the geographical scope of the area. Moving onto the water quality, the definitions are unified relating to the pollution level expressed, among others, by the 'excessive'. In other words, we can talk about pollution when such level has been reached that negatively affects several denominated values, such as human health, amenity and economic interest, not to mention the ecosystem. In being identified as a 'hot spot', the area entails imminent intervention and management to reduce the pollution. Correctly, Article 2 of Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities also covers that case when the pollution has merely "potential adverse impact" on the values indicated in the definition, so the prevention falls under the scope of this article.

Moving onto the 'sensitive areas', this phrase is defined as

"a geographically defined coastal or marine area, recognized to be of particular importance or particularly vulnerable to pollution considering the value of the biodiversity, the nature of the ecosystem, the value of ecosystem services, particular ecological processes, the contribution to economy and human welfare that the area hosts,

[676] Art. 1. (xi) of the Amended Nairobi Convention for the Protection, Management, Development of the Marine and Coastal Environment of the Western Indian Ocean.

[677] Art. 3. (xii) of the Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region.

and that requires particular attention and management efforts in order to avoid, reduce or minimise the risks of pollution or environmental degradation".[678]

This definition can be evaluated as the complete to be the opposite of the term 'hot spot', as hot spot enjoys special attention due to the unfavourable conditions ruling the areas, whereas 'sensitive areas' are in the centre of attention in order to not to destroy their favourable status. As can be seen, their scope in terms of geography is also limited area and being recognized as an area with "particular importance or particularly vulnerable to pollution" also forms part of the conditions such as the acknowledgement of several environmental values, moreover, "the contribution to economy and human welfare". So, we can identify the three pillars of sustainable development once again. In this case, the explicit goal is to prevent the pollution due to the significance of these areas.

4.2.2.2. Protection and preservation of marine and coastal ecosystem

Firstly, we will examine the provisions focusing on marine ecosystem,[679] followed by those ones concentrating on coastal ecosystem.[680] Finally, those documents will be mentioned that refer to both the marine and the coastal ecosystems.[681]

Starting with marine ecosystem in general, first, the Protocol on Protection of the Black Sea Marine Environment Against Pollution from Land Based Sources has to be mentioned that refers to "Effects on marine ecosystems, in particular living resources, endangered species, and critical habitats".[682] In other words, based on this approach,

[678] Art. 3. (xiii) of Annex I of Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region.
[679] Art. 2(1), Art. 3(2) and Annex I Part1 1.1of the Helsinki Convention; Preamble, Art.1 (d), Art.2(1) (a), Art.2(2), Art. 3(3) c), Art. 4(2) and Art. 5 (2) of the OSPAR Convention; Art. 13(2)(i) of Annex I.C.6.of Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region; Art. 2(i) of ANNEX I Source Categories, Activities and Associated Pollutants of Concern, C.2. of Protocol Concerning Pollution from Land-based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.
[680] Art. 15 of the Helsinki Convention; Art. 20 (g) of the Tehran Convention.
[681] Art. 1 of the Protocol on the Protection of the Marine Environment of the Black Sea From Land Based Sources and Activities; Art. 10(2) (c) of the Antigua Convention; Preamble of Annex I of Additional Protocol to the Abidjan Convention Concerning Cooperation in the Protection and Development of Marine and Coastal Environment from Land-based Sources and Activities in the Western, Central and Southern African Region; Preamble of Protocol Concerning Pollution from Land-based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.
[682] Convention on the Protection of the Black Sea Against Pollution, Protocol on Protection of the Black Sea Marine Environment Against Pollution from Land Based Sources, Annex III.

marine ecosystem includes but not limited to living resources, endangered species, and critical habitats.

Second, some conventions opted for using this phrase instead of 'marine environment' when determining the definition of pollution, such as the Helsinki Convention that defines 'pollution' as

"introduction by man, directly or indirectly, of substances or energy into the sea, including estuaries, which are liable to create hazards to human health, to harm living resources and marine ecosystems, to cause hindrance to legitimate uses of the sea including fishing, to impair the quality for use of sea water, and to lead to a reduction of amenities".[683]

Further, Annex II of the OSPAR Convention states that 'pollution'

"means the introduction by man, directly or indirectly, of substances or energy into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate uses of the sea".[684]

In addition, regarding the Wider Caribbean Region 'pollution of the Convention area' is defined as

"the introduction by humans, directly or indirectly, of substances or energy into the Convention area, which results or is likely to result in such deleterious effects as harm to living resources and marine ecosystems, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities".[685]

It has to be mentioned concerning these nearly identical definitions, on the one hand, as mentioned before, by using marine ecosystems instead of marine environment their scope seems to be narrower. On the other hand, another conspicuous difference between them is the geographical area for which these definitions are applicable, namely the 'sea' in the Helsinki Convention, the 'maritime area' of the OSPAR Convention and the 'Convention area' in the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region cover overlapping but not identical areas. Consequently,

[683] Art. 2(1) of the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention), signed in Helsinki in 1992.

[684] Art.1 (d) of the Annex II on the Prevention and Elimination of Dumping or Incinetration of the OSPAR Convention.

[685] Art. 1. (c) of the Annex I Source Categories, Activities and Associated Pollutants of Concern, C.2. of Protocol Concerning Pollution from Land-based Sources and Activities to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.

despite adopting marine ecosystems, these definitions can cover different areas of the marine environment depending on the geographical limits indicated in these documents.[686]

Moving onto the coastal ecosystem, first, Article 15 of the Helsinki Convention on Nature conservation and biodiversity has to be referred to that states that

"The Contracting Parties shall individually and jointly take all appropriate measures with respect to the Baltic Sea Area and its coastal ecosystems influenced by the Baltic Sea to conserve natural habitats and biological diversity and to protect ecological processes. Such measures shall also be taken in order to ensure the sustainable use of natural resources within the Baltic Sea Area".

Coastal ecosystems are explicitly mentioned as part of the Baltic Sea Area, as this article addresses nature conservation and biodiversity that are inseparable from the concept of ecosystem.[687] Moreover, when it comes to the Baltic Sea it cannot be overemphasised that thanks to its relatively closed location it belongs to the most vulnerable seas of the EU in terms of pollution.

Secondly, it is worth recalling Article 20 (g) of the Tehran Convention that declares *"improvement of knowledge about the hydrological regime and ecosystem dynamics of the Caspian Sea including sea level fluctuations and the effects of such fluctuations on the Sea and coastal ecosystems"*. This provision forms part of Article 20 of the Tehran Convention that states that

"The Contracting Parties shall co-operate in the conduct of research into and development of effective techniques for the prevention, control and reduction of pollution of the Caspian Sea and, to this effect, the Contracting Parties shall endeavour to initiate or intensify specific research programmes".

We have referred to this article concerning the dynamic character of the ecosystem. When it comes to the coastal ecosystem, as it follows from this article, these are the most vulnerable to the impacts of sea level fluctuation.

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[686] In connection with the definition of pollution and the marine ecosystem see also: Art. 3(2) of the Helsinki Convention states "The Contracting Parties shall apply the precautionary principle, i.e., to take preventive measures when there is reason to assume that substances or energy introduced, directly or indirectly, into the marine environment may create hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea even when there is no conclusive evidence of a causal relationship between inputs and their alleged effects".

[687] See: Convention on Biological Diversity (Biodiversity Convention) signed in Rio de Janeiro on 5 June 1992 and entered into force on 29 December 1993.

Last but not least, documents referring to both marine and coastal ecosystem will be discussed, namely the Black Sea Convention and the Antigua Convention.

Staring with Article 1 of the Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities on Purpose of the Protocol, it can be stated that

"The purpose of this Protocol is to prevent, control and to the maximum extent possible eliminate pollution from land-based sources and activities in order to achieve and maintain a good ecological status of the Black Sea, including its marine and coastal ecosystems".

Moving onto Art. 10(2) (c) of the Antigua Convention, it is prescribed to *"Encourage the preparation and use of methods of economic assessment of ecosystems and of marine and coastal ecosystems and of environmental goods and services at a national level"*.

In sum, we can conclude that the most relevant ascertainments from or research point of view are the following ones. First, marine ecosystem includes, in particular living resources, endangered species, and critical habitats".[688] Second, relating to the Baltic Sea Area, it was mentioned that it includes its coastal ecosystem.[689] Last but not least, Black Sea includes its marine and coastal ecosystems.[690]

4.2.2.3. Rare, fragile or vulnerable ecosystems

We can find numerous examples relating to rare, fragile or vulnerable ecosystems that is why will limit our examination to a few examples. Firstly, rare or fragile ecosystem[691] will be examined, followed by rare and/or vulnerable ecosystems.[692]

Starting with rare or fragile ecosystems, first, Article 10 on Conservation of Biological Diversity has to be mentioned that declares that

"*The Contracting Parties shall, individually or jointly, take all appropriate measures to protect and preserve biological diversity, rare or fragile ecosystems, as well as species*

[688] Convention on the Protection of the Black Sea Against Pollution, Protocol on Protection of the Black Sea Marine Environment Against Pollution from Land Based Sources, Annex III.
[689] Article 15 of the Helsinki Convention.
[690] Art. 1 of the Protocol on the Protection of the Marine Environment of the Black Sea from Land-Based Sources and Activities.
[691] Art. 10 of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean; Art. 11 of Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, Protocol concerning Co-operation in Combating Pollution in Cases of Emergency; Art. 10 of the Cartagena Convention**.**
[692] See: Art. 14.(1) (f) of Tehran Convention.

of wild fauna and flora which are rare, depleted, threatened or endangered and their habitats, in the area to which this Convention applies.[693]

Second, we have to refer to Article 11 on Specially Protected Areas that stipulates that *"The Contracting Parties shall, individually or jointly as the case may be, take all appropriate measures to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other marine life."*.[694]

Third, a strikingly similar definition can be found in Article 10 on Specially Protected Areas that declares that
"The Contracting Parties shall, individually or jointly, take all appropriate measures to protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened or endangered species, in the Convention area".[695]

Moving onto the rare and/or vulnerable ecosystems, we have to refer to Article 10(5) of the Antigua Convention that states that
"The Contracting Parties shall adopt appropriate measures to protect and preserve rare or vulnerable ecosystems in the area within the scope of this Convention, as well as the habitats of species with low populations or that are threatened or endangered".

Shortly, we can summarise the most important conclusions of the previous paragraphs. First, it has to be highlighted that all of them refer to the obligations to protect and preserve concerning the ecosystem as was the case with Article 192 of the UNCLOS relating to marine environment and with Article 20 of the Watercourses Convention relating to the ecosystem. Second, not surprisingly, we can identify alternatives relating to the term ecosystem in the aforementioned paragraphs such as rare or vulnerable ecosystem; moreover, rare or fragile ecosystems. Opting for alternatives instead of cumulative conditions means that the fulfilment of one condition is sufficient to impose the obligations relating to the ecosystem. The high protection level of the ecosystem can be concluded, as in addition to rare, fragile or vulnerable ecosystem, we cannot find such kind of requirement that the ecosystem should be 'valuable' or it should have a special

[693] Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean
[694] Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, Protocol concerning Co-operation in Combating Pollution in Cases of Emergency, New York, 1981.
[695] Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, Cartagena de Indias, 24 March 1983.

significance for whatever reason. These negative conditions, namely 'fragile' or 'vulnerable' justify the protection *per se*.

4.3. The definition of marine environment

After examining the different kinds of ecosystem concepts, our time has come to turn our attention to the phrase 'marine environment' or more specifically "marine environment, including estuaries". A clear understanding of this term is crucial from two perspectives. First, it forms part of the definition in Article 1(4) of the UNCLOS, namely the 'pollution of the marine environment'. Second, Article 192 of the UNCLOS on General Obligations stipulates that "States have the obligation to protect and preserve the marine environment". Nonetheless, not surprisingly, these are articles are interrelated.

Before starting our analysis relating to the meaning of the 'marine environment', it is practical to put this term into context. We have discussed the meaning of the term 'environment' relating to Article 20 of the Watercourses Convention. If we want to narrow down this concept to the environment relating to water, we can use the term aquatic environment, which necessarily covers the environment concerning freshwaters and sea water. So, if we wish to focus merely on the latter one, the phrase 'marine environment' seems to be the right terminology.

Armed with this information, first, we have to declare that the phrase 'marine environment' is not defined in the UNCLOS. However, l we can rely, on the one hand, on Kenya's draft definition concerning 'marine environment'. Regarding this definition, it has to be observed that though it is connected to a state, it was the only attempt to define 'marine environment' in the *travaux preparatoires* of the UNCLOS; consequently, it is a precious source. In this draft definition 'marine environment' is stipulated as "the area comprising the air space above the sea, the surface and the subsoil beyond the high tide mark including the living and non-living resources therein".[697] On the other hand, besides Kenya's draft, the other source it was possible to find was a Regional Seas Convention. The similarity is conspicuous between this concept and that one adopted by the Helsinki Convention, as it lays down that

[697] A/CONF.62/C.3/L.2 Kenya: draft articles for the preservation and the protection of the marine environment, Extract from the Official Records of the Third United Nations Conference on the Law of the Sea, Volume III (Documents of the Conference, First and Second Sessions.

"This Convention shall apply to the protection of the marine environment of the Baltic Sea Area which comprises the water-body and the seabed including their living resources and other forms of marine life".[698]

Additionally, it is worth noting that it was clarified during the negotiations of the UNCLOS that "marine environment includes marine life".[699] Not surprisingly, the most important part of the marine life from the humans point of view is the fish stock; nonetheless, interestingly, the Resolution of the United Nations Conference on the Law of the Sea refers to the "marine life, especially of whales and seals".[700]

After clarifying the meaning of the 'marine environment' relating to the law of the sea, it is high time to scrutinize the freshwater conventions in this respect, especially relating to the estuaries, as they are the link between the sea water and the freshwater when watercourses reach the sea. First, as was the case in the UNCLOS, Article 23 of the Watercourses Convention states concerning the 'marine environment' that "Marine environment, including estuaries". Second, the preamble of the Water Convention has to be mentioned that opted for the phrase "marine environment, in particular coastal areas". Concerning the 'coastal areas', in default of other sources, we can recourse to EU law. On the one hand, we can rely on Council Directive 91/271/EEC that defines 'coastal waters' as "waters outside the low-water line or the outer limit of an estuary". On the other hand, we have a more recent definition of 'coastal waters' adopted by the Water Framework Directive, in which it is defined as *"surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters"*.

After the examination of the approaches adopted by the Watercourses Convention and the Water Convention relating to 'marine environment', it is time to focus on the term 'estuaries'. First, we have to refer to the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) that defines

[698] Art. 4(1) of the Helsinki Convention.
[699] A/CONF.62/RCNG/1 Reports of the Committees and Negotiating Groups on negotiations at the resumed seventh session contained in a single document both for the purposes of record and for the convenience of delegations, p. 97.
[700] Humane Killing of Marine Life, *Resolution adopted on 25 April 1958, on the report of the Third Committee The United Nations Conference on the Law of the Sea.*

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres".[701]

Second, we have to take a look at Ramsar Classification System for Wetland Types, which classifies estuaries as Marine and Coastal waters, more specifically 'estuarine waters' belong to Category F covering "permanent waters of estuaries and estuarine systems of deltas".[702]

"*They are distinct and valuable environments in which continual mixing of freshwater and marine water generates a complex array of habitats. Estuaries perform important chemical and physical functions; they trap nutrients, filter toxic pollutants and transform wastes that enter from the watersheds, nearshore ocean, and the atmosphere".*[703]

Interestingly, it is worth devoting some thoughts to the significance of the estuaries concerning fish, as

"estuaries, saltmarshes, inshore rocky reefs, and sandy slopes) are extensively used as feeding and spawning grounds and nurseries by fishes with openwater adult stages. (…) Furthermore, many fishes in rivers, swamps or lakes spawn in one part of the ecosystem but spend their adult lives in other inland waters or in the sea. It is common for fishes in lakes to migrate up rivers to spawn, and for fishes in rivers to migrate downstream to a lake or estuary, or beyond the estuary to the sea, to spawn. Many swamp fishes migrate from deeper, more permanent waters to shallow, temporarily inundated areas for spawning".[704]

It follows from these approaches, on the one hand, that estuaries form part of the marine environment. On the other hand, while making clear that estuaries constitute integral part of the marine environment, they do not exclude anything else under the scope of the

[701] Art. 1(1) of the Ramsar Convention.

[702] Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance of the Convention on Wetlands (Ramsar, Iran, 1971), Third edition, as adopted by Resolution VII.11 (COP7, 1999) and amended by Resolutions VII.13 (1999), VIII.11 and VIII.33 (COP8, 2002), IX.1 Annexes A and B (COP9, 2005), and X.20 (COP10, 2008). Annex B on Ramsar Classification System for Wetland Type.

[703] J. Adams, 2012. Determination and implementation of environmental water requirements for estuaries. Ramsar Technical Report No. 9/CBD Technical Series No. 69. Ramsar Convention Secretariat, Gland, Switzerland & Secretariat of the Convention on Biological Diversity, Montreal, Canadap. 2.

[704] Criterion 8:A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend. para. 109-110.

marine environment and they do not specify further the meaning of the marine environment.

After reaffirming that estuary forms part of the marine environment, we should concentrate on the meaning of this phrase in default of definition in UNCLOS. First, we have to mention that we have discussed the second part of this phrase, namely the environment while analysing the Article 20 of the Watercourses Convention. Before checking the Regional Seas Conventions, it is worth referring to the Caspian Sea Convention that refers to the "environment,"[705] so it opted for a seemingly way too broad concept compared to other conventions. Moving onto those conventions followed the footsteps of Article 1(4) of the UNCLOS refers to the 'pollution of the marine environment'. However, it can be observed that only one of them was in favour of UNCLOS's terminology; however, some of these terms in other conventions look eerily like the one in the UNCLOS. First, Kuwait Convention has to be mentioned that adopted the term 'marine environment' *per se*. However, we can argue that it covers estuaries, especially, on the one hand, that estuaries are referred to in the UNCLOS (of which at least certain parts if not the whole document represent customary law); on the other hand, estuaries are not excluded from under the scope of the Kuwait Convention. Alternatively, we can find similar, but not identical solutions like in UNCLOS such as the Eastern Africa Convention refers to "marine and coastal environment, including estuaries," the North-East Pacific Convention to "marine environment (including estuaries and wetlands)", the Western Africa Convention to "marine environment, coastal zones, and related inland waters". In addition, the Helsinki Convention refers to the "sea, including estuaries". Sea can be determined as "all marine waters other than the internal waters of States".[706] Moreover, two definitions can be mentioned concerning the "maritime area". First, under the OSPAR Convention it is defined that

"the internal waters and the territorial seas of the Contracting Parties, the sea beyond and adjacent to the territorial sea under the jurisdiction of the coastal state to the extent recognised by international law, and the high seas, including the bed of all those waters and its sub-soil".[707]

[705]Art. 4 and Art. 5 of the Tehran Conention.
[706] Art. 3(3) of Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, signed in London on 29 December 1972.
[707] Art. 1(a) of the OSPAR Convention.

Second, under the Convention for the Prevention of Marine Pollution from Land-Based Sources, it is determined that

"the high seas, the territorial seas of Contracting Parties and waters on the landward side of the base lines from which the breadth of the territorial sea is measured and extending in the case of watercourses, unless otherwise decided under Article 16(c) of the present convention, up to the freshwater limit".[708]

Finally, the term 'convention area' can be noted that is determined as

"the marine environment of the Gulf of Mexico, the Caribbean Sea and the areas of the Atlantic Ocean adjacent thereto, south of 30 deg north latitude and within 200 nautical miles of the Atlantic coasts of the States referred to in article 25 of the Convention".[709]

So, as can be seen, marine environment forms part of this definition, albeit it is necessarily limited to certain areas.

4.4. Article 1(4) of the UNCLOS on the pollution of the marine environment

In this part, we will scrutinize the definition of 'pollution of the marine environment' in the UNCLOS. As mentioned before, the Article 21(1) of the Watercourses Convention, namely the definition 'pollution of the international watercourses' was modelled on Article 1(4) of the UNCLOS. So, we will grab the opportunity to utilize our previous analysis. Besides, it is also evident to take the chance to compare Article 1(4) of the UNCLOS to the other Regional Sea Conventions.

Before starting our analysis, it has to be mentioned that some Regional Seas Convention opted for not defining 'pollution of the marine environment' at all such as the Cartagena Convention. We can remember Lammers' observation concerning the definition of water pollution. Moreover, other Regional Seas Conventions, namely the Black Sea Convention, the Kuwait Convention, the Jeddah Convention, the Barcelona Convention and Lima Convention adopted exactly the same definition as in the UNCLOS. In addition, others were in favour a slightly different approach. However, these differences do not affect do not affect the meaning of the pollution to any great extent; consequently, we will not analyse them separately, but they will be referred to regarding their discrepancies compared to the UNCLOS.

[708] Convention for the Prevention of Marine Pollution from Land-Based Sources, signed in Paris, on 4 June 1974 (as amended by the Protocol of 26 March 1986).
[709] Art. 2.1. of the Cartagena Convention.

Article 1(4) of the UNCLOS defines the 'pollution of the marine environment' as

"the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources[710] *and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities".*[711]

Interestingly, before examining this definition, it is worth referring to Kenya's draft article concerning the preservation and the protection of the marine environment. First, it is noteworthy that Kenya's draft determined the 'pollution of the marine environment' as the "introduction, deliberately or otherwise and directly or indirectly of marine pollutants into the marine environment".[712] Second, Kenya also defined the term 'marine pollutant' as

"any substance or energy which if introduced to the marine environment results in such deleterious effects as harm to the living resources, hazard to human health, hindrance to marine activities, reduction of marine amenities and impairment of the quality for use of the marine waters".[713]

Although this draft was later not adopted, it can be interesting to compare it to the final version of the UNCLOS and to make some remarks. As can be seen, the message of Article 1(4) of the UNCLOS is actually separated into two parts in Kenya's draft, as the term 'marine pollutant' incorporates and explicates the second part of Article 1(4). Though this draft explicitly mentions that introduction caused "deliberately or otherwise" falls under the scope of the article, it can be argued that in default of referring to them both cases are covered as they are not explicitly excluded. Interestingly, the introduction caused by 'man' is not indicated; however, we have mentioned several times that pollution triggered by nature has no legal relevance, so even without referring to humans anyhow in the definition human factors have to be included in the definition. In addition, it has to be mentioned concerning 'man' that it is stated in the Preamble of Framework Convention for the Protection of the Marine Environment of the Caspian Sea that "human

[710] See: Art. 61 of the UNCLOS.

[711] This definition was also adopted by Art. 2(f) of 1986 Convention for the Protection of the Natural Resources and Environment of the South Pacific Region.

[712] A/CONF.62/C.3/L.2
Kenya: draft articles for the preservation and the protection of the marine environment' p. 245.

[713] A/CONF.62/C.3/L.2 Kenya: draft articles for the preservation and the protection of the marine environment Extract from the Official Records of the Third United Nations Conference on the Law of the Sea, Volume III (Documents of the Conference, First and Second Sessions.

activities, including the discharge, emission and disposal of harmful and hazardous substances, wastes and other pollutants".[714] As can be seen, this approach limits the contribution of the humans to the activities.

After this short introduction, it is time to focus on the elements of the Article 1(4) of the UNCLOS as far as they were not put under the microscope relating to the Watercourses convention and the Water Convention. Before embarking upon the analysis of the term 'introduction', it is worth shortly referring to Article 21(1) of the Watercourses Convention. First, as mentioned earlier, in adopting 'pollution of an international watercourse', the ILC opted for a 'way too general' definition that can be detected, among others, in that the fact that the manner by which pollution can be caused is not determined. Second, nonetheless, it cannot be skipped that pollution can be caused by several ways such as introduction, discharge, release or emission just to name a few examples. Consequently, the approach adopted by the UNCLOS differs from the Watercourses Convention, as the word 'introduction' does form part of Article 1(4) of the UCLOS. That is why we did not devote much attention to 'introduction' earlier, and that is why dealing with this topic cannot be delayed any more. First, we have to observe that neither UNCLOS nor the regional seas conventions contain any definition concerning the term 'introduction'. Second, in default of a definition concerning 'introduction', it is practical to identify those provisions other than Article 1(4) of the UNCLOS contains the word 'introduction'. Starting with Article 196 of the UNCLOS[715] regarding the "introduction of alien or new species," not surprisingly, on the one hand, we can identify strikingly similar phrases adopted by regional seas conventions such as "introduction of invasive alien species" in the Tehran Convention[716] and "introduction of exotic species" and the "other forms of environmental deterioration" in the Antigua Convention.[717] On the other

[714] Preamble of Framework Convention for the Protection of the Marine Environment of the Caspian Sea
[715] Art. 196(1) of UNCLOS stipulates that „ States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.".
[716] Art. 1 of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran Convention) determines 'Invasive alien species' as „an alien species whose establishment and spread may cause economic or environmental damage to the ecosystems or biological resources of the Caspian Sea". Furtehermore, Art. 12 of the Tehran Convention state "The Contracting Parties shall take all appropriate measures to prevent the introduction into the Caspian Sea and to control and combat invasive alien species, which threaten ecosystems, habitats or species".
[717] Art. 3 (1) e of the Art. 3 (1) e of the Antigua Convention states that the "Other forms of environmental deterioration means activities of man-made origin that may alter the quality of the marine environment and its resources and affect them in such a way as to reduce their natural recovery and regeneration capacity, such as erosion, the introduction of exotic species, protection capacity against natural phenomena, etc."

hand, as mentioned earlier, Article 22 on Introduction of alien or new species of the Watercourses Convention uses the same term. However, as reasoned before, though the introduction of alien or new species can have harmful effects upon the water quality, it is not generally regarded as pollution *per se*, since its detrimental effects on the environment are not generally regarded as pollution.[718] In addition, Article 196(2) of the UNCLOS clarifies the relationship between Article 194[719] and Article 196 of UNCLOS, as it states that "This article does not affect the application of this Convention regarding the prevention, reduction and control of pollution of the marine environment". Moving onto another provision containing the term 'introduction', Article 246 of the UNCLOS has to be mentioned that refers to the "introduction of harmful substances into the marine environment".[720]

After checking the UNCLOS, the next logical step would be to perform the same analysis in the Regional Seas Conventions. However, interestingly, as will be seen, it is more helpful to rely on the EU law in order to continue our research. Starting with the definition of 'pollution' in the Water Framework Directive, it is conspicuous that it contains the term 'introduction' as it refers to "direct or indirect introduction".[721] Moreover, it states that "Direct discharge to groundwater" means "discharge of pollutants into groundwater without percolation throughout the soil or subsoil".[722] The adoption of the term 'discharge' is crucial from our point of view as Directive 2006/11/EC defines 'discharge' as *"the introduction into the waters referred to in Article 1 of any substances in List I or List II of Annex I, with the exception of:*

(i) discharges of dredgings;

(ii) operational discharges from ships in territorial waters;

(iii) dumping from ships in territorial waters".[723]

Based on this definition we can conclude that discharge can be handled as a special type of introduction; though we cannot ignore that certain types of discharges and dumping

[718] Commentary of the Watercourses Convention, 1994, p. 122. Moreover, Art. 25. of the Berlin Rules cover only alien species.

[719] Remark: Art. 194 of the UNCLOS on Measures to prevent, reduce and control pollution of the marine environment.

[720] Art. 246(5)b of the UNCLOS.

[721] Art. 2(33) of the Water Framework Directive.

[722] Art. 2(32) of the Water Framework Directive.

[723] Art. 2(d) of the Directive 2006/11/EC of the European Parliament and of the Council of 15 February 2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. See also: Art. 1.2.(d) of COUNCIL DIRECTIVE of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (76/464/EEC).

are excluded under the scope of Article 2(d) of Directive 2006/11/EC; however, it can be attributable to the special topic.

After accepting that the term 'introduction' includes the term 'discharge', it is time to turn our attention to the Regional Seas Conventions, in which numerous reference to the different kinds of discharges can be found, first and foremost, relating to ships such as discharge from ships,[724] discharges from ships,[725] intentional or accidental discharges from ships[726] and normal or accidental discharges from ships.[727] So, it cannot be a coincidence that we found the term 'discharge' concerning pollution from ships. Otherwise, it can be defined as *"in relation to harmful substances or effluents containing such substances, means any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying"*.[728] As can be seen, as part of this definition the term 'release' as well as other terms covered by 'release' are mentioned. In connection with the term 'release', it can be further observed that it is generally used just like the aforementioned definition shows concerning harmful substances such as "release of harmful substances directly arising from the exploration, exploitation and associated off-shore processing of sea-bed mineral resources" or "release of harmful substances for purposes of legitimate scientific research into pollution abatement or control;"[729] furthermore, "release of toxic, harmful or noxious substances, especially those which are persistent".[730] In addition, the term 'discharges' can be identified in the Antigua Convention and it "refers to the pollution of the marine and coastal environment deriving from spills, disposal or dumping of wastes and hazardous substances from ships, aircraft, the atmosphere or land-based sources of pollution".[731] Based on this definition, we can continue are train of thought by scrutinizing the term

[724] Art. 6 of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean.
[725] Art. 5 of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.
[726] Art. 4 of the Kuwait Regional Convention for Co-operation on the Protection of the Marine Environmentfrom Pollution.
[727] Art. 5 of the Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region.
[728] Regulation 3.2(a) of Annex IV Prevention of Pollution from Ships of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992.
[729] Regulation 3.2(b) of Annex IV Prevention of Pollution from Ships of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992.
[730] Art. 4 (a) of the Lima Convention.
[731] Art. 3 (1) f) of the Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua Convention), adopted in 18 February 2002. Contracting Parties are Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.

'dumping' that is defined as "the deliberate discharge of substances or other materials into the sea or from ships or aircraft"[732] in the Antigua Convention. However, concerning 'dumping' we have to definitely make a mention of Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter that stipulates 'dumping' as

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

(ii) any deliberate disposal at sea of vessels, aircraft, platforms or other manmade structures at sea".[733]

After discussing the term 'dumping', we are still obliged to devote attention to the term 'emission' relating to the term 'discharge'. Starting with Council Directive 1999/13/EC that states that 'emission' means "any discharge of volatile organic compounds from an installation into the environment,"[734] in this case the relationship between the two terms are evident based on the text, namely the term 'emission' forms part of the term 'discharge'. Moving onto Directive 2001/81/EC that stipulates 'emission' as "the release of a substance from a point or diffuse source into the atmosphere",[735] we can recall our previous argumentation relating to the terms 'discharge' and 'release' that further confirms that 'emission' constitutes part of the term 'discharge' and consequently to the term 'introduction'. On top of it all, we can take the risk to say that the terms 'discharge' and 'emission' are used synonyms, that can be illustrated with the following example: discharges into the atmosphere from activities under their jurisdiction.[736] So, instead of using the term 'introduction' "discharges or emissions from offshore sources".[737]

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[732] Art. 3 (1) g) of the Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua Convention), adopted in 18 February 2002. Contracting Parties are Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.

[733] Art. 3(1)a) of the of Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. Additionally, see Art. 3(1)b) of the aforementioned Convention relating to those activities excluded under the scope of 'dumping', namely "(i) the disposal at sea of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures; (ii) placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this Convention".

[734] Art. 2(9) of the Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

[735] Art. 3(e) of the Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants.

[736] Art. 9 of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.

[737] Art. 3.2 of Annex 3 of Convention for the Protection of the Marine Environment of the North-East Atlantic.

Moreover, 'discharge' is also used relating to the coastal areas, such "discharges from rivers, estuaries, coastal establishments and outfalls"[738] and "*coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures, or any other sources on their territories".*[739]

Moving onto the phrase "directly or indirectly", we can say that apart from pollution through river flows[740] or as indicated in Article 207 of the UNCLOS "land-based sources, including rivers, estuaries" and pollution from or through the atmosphere,[741] other sources can be determined as direct ones, such as pollution from seabed activities subject to national jurisdiction,[742] pollution from activities in the Area,[743] pollution by dumping[744] and pollution from vessels.[745]

Turning our attention to "substances or energy". Interestingly, it is wort noting that the Nairobi Convention added the term 'organisms' to this definition which may mean that biological pollution forms part of their approach. We have discussed the meaning of the term 'substance' in detail relating to Article 21 of the Watercourses Convention. As we turn our attention to the law of the sea, it is noteworthy focusing on special categories of substances, namely 'harmful' and 'hazardous' substances. As mentioned earlier, the Water Convention stipulates 'hazardous substances' as "*substances which are toxic, carcinogenic, mutagenic, teratogenic or bio-accumulative, especially when they are persistent".*[746] In other words, they are such kind of substances which possess any of those properties, moreover, their persistency is highlighted as a main concern. Besides freshwaters, Regional Seas Conventions also devote attention to this question. Three conventions, namely the Convention on the Protection of the Marine Environment of the Baltic Sea Area, Convention on the Protection of the Black Sea Against Pollution, both adopted in 1992, just like the Water Convention and MARPOL define 'harmful

[738] Art. 7 of the Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region.
[739] Art. 7 of Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.
[740] Art. 2. (a) of the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region, adopted in Nairobi on 21 June 1985, entered into force 30 May 1996. Art. 2. (c) Amended Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region, adopted in Nairobi on 31 March 2010.
[741] Art. 212 of the UNCLOS.
[742] Art. 208 of the UNCLOS.
[743] Art. 209 of the UNCLOS.
[744] Art. 210 of the UNCLOS.
[745] Art. 211 of the UNCLOS.
[746] Art. 1.6 of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes as amended, along with decision VI/3 clarifying the accession procedure,

substances'. Starting with the former one, it defines 'harmful substance' as "any substance, which, if introduced into the sea, is liable to cause pollution".[747] As can be seen, it is a way to general phrasing, as it focuses on the result, namely the pollution and, contrary to the Water Convention, it does not even attempt to describe at least certain or main characteristic of these substances. The phrase "liable to cause pollution" looks strikingly similar to the terms "result" and 'create'. Last but not least, "if introduced into the sea" mean that these substances do not necessarily pose a threat in general, but in the sea. Moving onto the Helsinki Convention, it states that

"Harmful substance means any hazardous, noxious or other substance, the introduction of which into the marine environment would result in pollution or adversely affect the biological processes due to its toxicity and/or persistence and/or bioaccumulation characteristics".[748]

Lastly, MARPOL states that "harmful substances are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code) or which meet the criteria in the appendix of this Annex".[749]

Turning our attention to the 'hazardous substances', two conventions provide us definition, namely the Convention on the Protection of the Marine Environment of the Baltic Sea Area and the Tehran Convention. Embarking upon the former one, the Convention on the Protection of the Marine Environment of the Baltic Sea Area defines 'hazardous substance' as "*any harmful substance which due to its intrinsic properties is persistent, toxic or liable to bio-accumulate"*.[750] Based on this definition, first, it can be observed that compared to 'harmful substances', 'hazardous substances' cover a narrower category. Second, it approaches from their properties. Moving onto the Tehran Convention, it states that 'hazardous substance' is "*any substance, which is toxic, carcinogenic, mutagenic, teratogenic or bioaccumulative, especially when they are*

[747] Art. 2. (7) of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, adopted in Helsinki in 1992, entered into force on 17 January 2000. Contracting Parties are Denmark, Estonia, European Union, Finland, Germany, Latvia, Lithuania, Poland, Russian Federation and Sweden.
[748] Art. II. (4) of the Convention on the Protection of the Black Sea Against Pollution (Black Sea Convention), adopted in Bucharest on 21 April 1992, entered into force on 15 January 1994.
[749] Regulation 1 Definitions Amendments to MARPOL Annex III.
[750] Art. 2. (7) of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, adopted in Helsinki in 1992, entered into force on 17 January 2000. Contracting Parties are Denmark, Estonia, European Union, Finland, Germany, Latvia, Lithuania, Poland, Russian Federation and Sweden.

persistent".[751] In other words, compared to the previous phrasing persistency is not merely one element, but the other features, if these substances are persistent.

Finally, in addition, we have to share some thoughts concerning energy. In case of sea water, instead of thermal pollution as was the case with freshwaters, noise pollution[752] pose a threat to the marine environment that can be best described in the following way: *"However, seismic surveys for fossil fuels (oil and gas) are not the only anthropological sources of marine pollution caused by noise. It can also be a noise from maritime transport or nautical tourism, different military equipments such as the sonar to detect submarines, etc." (...) The sound is produced as a result of spreading pressure waves from a particular source that flickers within different types of substances (for example air or water)".*[753]

4.5. Article 194(1) on Measures to prevent, reduce and control pollution of the marine environment

Article 194(1) of the UNCLOS on Measures to prevent, reduce and control pollution of the marine environment stipulates that

"States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection".

Embarking upon the elements of this paragraph, first, it is conspicuous that as was the case with Article 192 and 193 of the UNCLOS, Article 194(1) also refers to 'States' instead of 'coastal States'. This wording can be justified, on the one hand, by the role land-locked states play in the land-based marine pollution, especially via international watercourses and through the atmosphere. On the other hand, it can further refer to the marine pollution caused, among others, by warships and other governmental ships owned by land-locked states.

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[751] Framework Convention for the Protection of the Marine Environment of the Caspian Sea, signed in Tehran on 4 November 2003. **Contracting Parties are** Azerbaijan, Islamic Republic of Iran, Republic of Kazakhstan, Russian federation and Turkmenistan.

[752] On the effects of noise on aquatic life see; A.N. Popper & A.D. Hawkins (Eds.) *The Effects of Noise on Aquatic Life*, Springer, New York, 2012.; A.N. Popper & A.D. Hawkins (Eds.) *The Effects of Noise on Aquatic Life II*, Springer, New York, 2016.

[753] I. Saric & R. Radonja, 'Noise as a source of marine pollution', *Scientific Journal of Maritime Research* Vol. 28, 2014, pp. 31-39.

Second, Article 194(1) of the UNCLOS adopted an interesting solution concerning the sources of marine pollution when opting for the phrase "any source" of pollution. On the one hand, it has to be mentioned that the paragraph would cover all sources of pollution even without referring to "any source" explicitly. That follows from the fact that in default of any restriction of polluting sources, this paragraph should be interpreted as it covers all sources. However, on the other hand, it has to be highlighted that UNCLOS devotes several articles to different sources of pollution such as pollution from land-based sources,[754] pollution from seabed activities subject to national jurisdiction,[755] pollution by dumping,[756] pollution from vessels[757] and pollution from or through the atmosphere.[758] In addition, it is noteworthy that by adopting Article 209 on Pollution from activities in the Area, practically all activities resulting in marine pollution are covered by the UNCLOS.

Third, it is worth paying attention to the phrase "the best practicable means at their disposal and in accordance with their capabilities". While the first part of this phrase may reflect the special characteristics of each sea basin, which claim different technical approaches and solutions, whereas in the second part the word 'capabilities' may refer to both technical and financial differences of the states. Although it can be argued that the phrase "at their disposal" may also involve reference to the differences in the financial opportunities of certain states and regions.

Finally, the phrase "they shall endeavour to harmonize their policies in this connection" has to be mentioned, as it can be paralleled with the second part of Article 21(2) of the Watercourses Convention which states that "Watercourse States shall take steps to harmonize their policies in this connection". In other words, while these two conventions emphasise the necessity of harmonisation, it follows from the wording that complete harmonisation of these policies is not required.

After these general remarks on Article 194(1) of the UNCLOS, we will focus on the obligation to "prevent, reduce and control pollution". First, it is worth noting that all the observations indicated earlier concerning these obligations in the Watercourses Convention are also applicable to Article 194(1) of the UNCLOS. Nonetheless, it is worth

[754] Art. 207 of the UNCLOS.
[755] Art. 208 of the UNCLOS
[756] Art. 210 of the UNCLOS
[757] Art. 211 of the UNCLOS.
[758] Art. 212 of the UNCLOS.

mentioning that we have referred to them concerning Article 21(2) of the Watercourses Convention.

Now we can check how many conventions opted for adapting these three obligations, namely the obligation to prevent, reduce and control pollution just like the UNCLOS. We can conclude that three conventions, namely the Convention on the Protection of the Black Sea Against Pollution,[759] the Tehran Convention[760] and the Cartagena Convention[761] followed exactly the same pattern.

Starting with Article 5 of the Convention on the Protection of the Black Sea Against Pollution declares that

"*The Contracting Parties shall take individually or jointly, as appropriate, all necessary measures consistent with international law and in accordance with the provisions of this Convention to prevent, reduce and control pollution thereof in order to protect and preserve the marine environment of the Black Sea".*[762]

As can be seen, first, this paragraph points out to measures concerning international law including but not limited to international environmental law. Second, the provisions of the Convention on the Protection of the Black Sea Against Pollution are also mentioned, among others, the preservation of the natural resources and amenities of the Black Sea,[763] pollution by hazardous substances and matter,[764] pollution from land-based sources[765] and pollution from vessels.[766]

Last, it has to be mentioned that the ultimate goal of this paragraph is clarified, namely the protection and preservation of the marine environment of the Black Sea and the function of the obligation to prevent, reduce and control is to reach this goal. In other words, on the one hand, a direct link between the obligation to prevent, reduce and control pollution and the achievable goal, namely the protection and preservation of the marine environment can be identified. On the other hand, thanks to the determination of the achievable goal, we can conclude that the protection and the preservation of the marine

[759] Art. 5(2) of the Convention on the Protection of the Black Sea Against Pollution.
[760] Art. 4. a) of the Tehran Convention.
[761] Art. 4(1) of the Cartagena Convention.
[762] Art. 5(2) of the Convention on the Protection of the Black Sea Against Pollution on General Undertakings.
[763] Preamble of the Black Sea Convention.
[764] Art. VI of the Black Sea Convention.
[765] Art. VII of the Black Sea Convention.
[766] Art. VIII of the Black Sea Convention.

environment function as a threshold when determining to what extent the pollution has to be prevented, reduced and controlled.

Moving onto Article 4 of the Tehran Convention on General Obligations stipulates that "*The Contracting Parties shall:*

(a) individually or jointly take all appropriate measures to prevent, reduce and control pollution of the Caspian Sea.

(b) individually or jointly take all appropriate measures to protect, preserve and restore the environment of the Caspian Sea".

In comparing Article 4 of the Tehran Convention with Article 5 of the Black Sea Convention, it is conspicuous that they basically follow the same logic, namely after laying down the obligation to prevent, reduce and control pollution, they determine the goal they wish to achieve. Nonetheless, two minor differences can be observed. On the one hand, Tehran Convention prescribes an additional obligation, namely the obligation to restore the environment. Adding this obligation to the obligation to protect and preserve can be explained by the fact that if the state of the environment so requires, first, the restoration will be necessary and that will be restored followed by the protection. In this sense, it can be stated that although it can be justified that the obligation to restore forms a separate obligation, its strong relationship to the obligations to protect cannot be questioned. Alternatively, it can be argued that the obligation to restore forms part of the obligation to protect. Consequently, the aim of referring to the obligation of restore separately is to indicate that due to adverse change in the status of the environment, first, these problems have to be remedied both in qualitative and quantitative sense, followed by the protection of the improved environmental conditions. On the other hand, as can be seen, Tehran Convention opted for adopting 'environment' that is, as mentioned before, a broader concept compared to 'marine environment'. In addition, it cannot be skipped that the two parts, namely the obligations and the goals are definitely interrelated; however, those are not connected at the same clear way just like in the Black Sea Convention. Nonetheless, despite seemingly being separated from each other, it is evident that the second group of obligations, such as the obligation to "protect and preserve and restore the environment of the Caspian Sea" are not achievable without the first one.

Thirdly, Article 4 of the Cartagena Convention stipulates that

"The Contracting Parties shall, individually or jointly, take all appropriate measures in conformity with international law and in accordance with this Convention and those of

its protocols in force to which they are parties to prevent, reduce and control pollution of the Convention area and to ensure sound environmental management, using for this purpose".

When it comes to Article 4(1) of Cartagena Convention, it can be noted that the obligation to "ensure sound environmental management" can be found in addition to the obligation to "prevent, reduce and control pollution". However, before analysing their relationship, it should be noted that the first part of this paragraph, namely the reference to the international law and the convention relating to the measures are nearly identical with the first part of Article 5 of the Convention on the Protection of the Black Sea Against Pollution.

Before analysing the meaning of the other obligations in the Regional Seas Conventions, it is worth summarising our observations concerning the obligation to prevent, reduce and control pollution. Starting with the obligation to prevent, we can easily recognise, on the one hand, that it can be found in all regional seas conventions. On the other hand, it is mentioned in the first place proceeding every single other obligation.

Second, moving to the obligation to reduce, first, it has to be noted that contrary to the obligation to prevent, it cannot be found in every Regional Seas Convention. Second, when this obligation is imposed to the states, it is placed after the obligation to prevent. Besides, as we have recognised, those regional seas conventions that follow the pattern of the UNCLOS, namely the Nairobi Convention[767] Article 4 of Abidjan Convention[768] and Antigua Convention[769] contain an additional obligation or provision concerning the threshold, as without a threshold all reduction, even the slightest one would fulfil this obligation.

Third, moving onto the obligation to control, in addition to Convention on the Protection of the Black Sea Against Pollution, the Tehran Convention and the Cartagena Convention, this obligation can be found in the Antigua Convention,[770] Lima Convention and Abidjan Convention. In addition to our previous remarks, it is worth noting that states have different opportunities to control pollution depending on whether we talk about direct or indirect discharge from point or non-point sources taking into account their

[767] Art. 4(1) of the Amended Nairobi Convention for the Protection, Management, Development of the Marine and Coastal Environment of the Western Indian Ocean (adopted in Kenya on 31 March 2010).
[768] Art. 5(1) of the Antigua Convention.
[769] Art. 4(1) of the Abidjan Convention.
[770] Art. 4(1) of the Abidjan Convention.

financial and technological capabilities. Moreover, interestingly, Lima Convention while referring to Measures to prevent, reduce and control pollution of the marine environment in the title of Article 4. This article states that

"*The measures adopted by the High Contracting Parties to prevent and control pollution of the marine environment shall include, inter alia measures designed to minimize to the fullest possible extent:*

(a) Release of toxic, harmful or noxious substances, especially those which are persistent:

(i) From land-based sources

(ii) From or through the atmosphere; and

(iii) By dumping."

As can be seen, merely the obligation to prevent and control forms part of this paragraph that raises the question to what extent the omission of obligation of reduce influences the scope of this paragraph. On the one hand, it is possible to argue that UNCLOS was signed by the contracting parties of the Lima Convention. On the other hand, it draws the attention to the relationship between the obligation to prevent and the obligation to reduce. However, before analysing this question, we should take a glimpse at the obligation to prevent and control in the Lima Convention. As can be seen in the Article 4 of the Lima Convention, states are obliged to "prevent and control pollution of the marine environment shall include, inter alia measures designed to minimize to the fullest possible extent (…)". It can be argued that the phrase "minimize to the fullest possible extent" functions as a threshold, which determines to what extent it is necessary to reduce pollution. In this sense, it is possible to interpret the word 'minimize' that way that compared to the obligation to reduce, it does not cover merely slight reduction of pollution, but it claims the lowest possible level of pollution, so it is not equal with complete ban of pollution.

After discussing the relationship between the obligation to prevent and control, it is worth taking a glimpse at the Helsinki Convention that adopted merely the obligation to prevent and eliminate pollution.

Article 3 of the Helsinki Convention states

"The Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures to prevent and eliminate pollution in order to

promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance".[771]

In examining this paragraph, first, we can ascertain that similarly to the Water Convention, Article 3 of the Helsinki Convention specifies certain types of measures, though as can be seen, there is no limitation to certain types of measures as far as they are 'appropriate'.

Second, interestingly, the obligation to prevent is supplemented with the obligation to eliminate. Before discussing the exact meaning of these obligations, it is worth paying attention to the obligation to eliminate at first. Our starting point should be the meaning of the word 'eliminate' which means "completely remove". Armed with this information, on the one hand, it is advisable to recall the differentiation between future and existing pollution in the Watercourses Convention concerning the obligation to prevent, reduce and control. Consequently, while the obligation to prevent pollution may refer to prevention of future pollution, whereas the obligation to eliminate may refer to the existing pollution, as obviously, we cannot talk about the removal of pollution in default polluting substance or energy resulting in pollution. Besides, it is noteworthy that the obligation to eliminate can be paralleled with the obligation to reduce, as both applies to the existing pollution and aims to reach a drop in the pollution level. However, it can be said that the obligation to eliminate goes further than the obligation to reduce, as the former one refers to the complete removal of the pollution, so the reduction of pollution *per se* is not sufficient to fulfil this obligation. In addition, it has to be noted, on the one hand, that the complete removal of the pollution would be neither technically nor financially feasible, not to mention that it would contradict to the concept of environmental economics relating to pollution. On the other hand, as can be seen, in the second part of the paragraph, "ecological restoration of the Baltic Sea Area and the preservation of its ecological balance" are mentioned as an achievable as a result of the reduction and elimination of pollution. Consequently, there no need to fully remove all the pollution as far as the fulfilment of the obligations and the achievable goals are in harmony. In other words, once again we can observe that the goals function as threshold to determine the extent of the obligations relating to pollution. Finally, regarding the obligation it is worth referring to the aforementioned argumentation with the exception that it refers to future pollution. In sum, it can be summarised that the obligation to prevent

[771] Article 3(1) of the Helsinki Convention on Fundamental principles and obligations.

and eliminate covers the same thing, but the former refers to future while the other one to existing pollution.

Article 4 on General Obligations

"1.The Contracting Parties shall, individually or jointly, take all appropriate measures in conformity with international law and in accordance with the Convention and those of its protocols in force to which they are party, to prevent, reduce and combat pollution of the Convention area and to ensure sound environment management of natural resources, using for this purpose the best practicable means of their disposal, and in accordance with their capabilities".[772]

Starting with the first and last part of this article, first, as can be seen, the rule regarding the measures are identical to Article 5 of the Convention on the Protection of the Black Sea Against Pollution, so our previous observations relating to this part are also applicable here. Second, one the one hand, we have discussed the meaning of the obligation to "to ensure sound environment management of natural resources" relating to Article 4 of the Cartagena Convention. On the other hand, we have analysed the meaning of "the best practicable means of their disposal, and in accordance with their capabilities" relating to Article 194(1) of the UNCLOS. However, interestingly, it has to be mentioned that Kenya Convention connects these aforementioned parts.

Moving onto the obligation "to prevent, reduce and combat pollution", first, it has to be mentioned that as we have discussed the relationship between the obligation to prevent and reduce, we will focus our attention on the obligation to combat that can include both fight against pollution as well as the elimination of pollution. Article 4(1) of Barcelona Convention on General Obligations may endeavour to manage this situation when it states that

"The Contracting Parties shall individually or jointly take all appropriate measures in accordance with the provisions of this Convention and those Protocols in force to which they are party to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea Area and to protect and enhance the marine environment in that Area so as to contribute towards its sustainable development".

[772] Amended Nairobi Convention for the Protection, Management, Development of the Marine and Coastal Environment of the Western Indian Ocean (adopted in Kenya on 31 March 2010)

In other words, the aim of this provision is relating to the obligation to combat is clarified as the phrase "to the fullest possible extent eliminate pollution" is added.

In addition, we have to refer to the obligation to avoid pollution, as stated in Article 5(1) of Antigua Convention on General obligations

"The Contracting Parties shall, unilaterally, bilaterally or multilaterally, adopt appropriate measures pursuant to the provisions of this Convention, to prevent, reduce, control and avoid pollution of the marine and coastal environment of the Northeast Pacific, as well as other forms of deterioration that may affect these, and ensure sustainable environmental management of the marine and coastal areas and an effective development of their natural resources".

This wording of the Antigua Convention raises the question whether we have to interpret the obligation to avoid as synonym of the obligation to prevent; however, it would not have much sense to repeat it. So, the role this obligation plays in Article 5(1) of Antigua Convention is not clear.

In sum, it can be concluded that the majority of the Regional Sea Conventions opted for similar but slightly different terminologies in terms of that level to which pollution should be reduced. Based on the analysis of the adopted words in Regional Sea Conventions it can be declared, on the one hand, that it is possible to express the same content with different words like prevent, reduce and control. On the other hand, it can be noted that some terminology or the combination of these terminologies provide us a clearer idea about the achievable water quality.

4.6. Marine pollution from land-based sources

This part wishes to explore the intersection between the international watercourses and the marine environment. In other words, the conflicting interests between the riparian and the coastal states relating to the marine pollution from land-based sources, more specifically marine pollution via international watercourses. First, land-based sources of marine pollution will be discussed in general, followed by Article 207 of the UNCLOS on Pollution from land-based sources. Second, the relevant provisions of the two universal freshwater conventions, namely the Watercourses Convention and the Water Convention will be analysed.

4.6.1. The marine pollution from land-based sources in general

The land-based sources of marine pollution constitute approximately 80 per cent of all marine pollution,[773] consequently, it can be referred to as a principle source of marine pollution. It arises from two general sources. The first group of the sources accounting for 44 per cent of all pollution, can reach the marine environment by introducing substances or energy into the freshwater[774] and it enters into the sea either from rivers or from direct discharges into coastal waters.[775] While, the second group of sources are constituted by those pollutions arising from or through the atmosphere as a result of land-based activities and those account for 33 per cent of the marine pollution.[776] Alternatively, we can rely on the Convention for the Prevention of Marine Pollution from Land-Based Sources[777] that defines 'pollution from land-based sources' as

"the pollution of the maritime area (i) through watercourses, (ii) from the coast, including introduction through underwater or other pipelines, (iii) from man-made structures placed under the jurisdiction of a Contracting Party within the limits of the area to which the present convention applies. (iv) by emissions into the atmosphere from land or from man-made structures as defined in subparagraph (iii) above".

Other, sources, among others, pollution by dumping or pollution from vessels are responsible for the remaining part.

As can be seen, the freshwater quality or more specifically the quality of the watercourses leads us on to another problem, namely, the land-based marine pollution via watercourses. Due to the hydrological cycle, waters on Earth are linked.[778] Therefore, pollutants introduced or reaching rivers by the flowing water will sooner or later reach the sea.[779] Consequently, the quality of rivers directly affects the marine environment, which also has important roles such as fishery, shipping or recreation.[780] The intersection between

[773] http://ourocean2016.org/marine-pollution/

[774] P. Sands & J. Peel, *Principles of International Law*, 3rd ed, Cambridge University Press, Cambridge, 2012, pp. 372-373. See also: D. Hassan, *Protecting the Marine Environment from Land-based Sources of Pollution: Towards Effective International Cooperation*, Ashgate, Aldershot, 2006, pp. 15-16.

[775] Boisson de Chazournes, 2013, p. 116.

[776] Sands & Peel, 2012, pp. 372-373.; Hassan, 2006, pp. 15-16.

[777] Article 3(c) of Convention for the Prevention of Marine Pollution from Land-Based Sources (as amended by the Protocol of 26 March 1986), signed in Paris on 4 June 1974.

[778] A.C. Kiss & D. Shelton, *International Environmental Law*, 3rd edition, Ardsley: Transnational Publishers, New York, 2004, p. 455.

[779] Boisson de Chazournes, 2013, p. 5.

[780] *Protecting coastal and marine environments from land-based activities: A guide for national action* UNEP (2006) at 2.; D. Shelton & A. Kiss. *Judicial handbook on Environmental Law*, UNEP, Stevenage, 2005, p. 65.

the freshwater and the sea water quality makes it necessary to deal with the question of marine pollution from land-based sources. It has to be highlighted concerning this topic that although the "problem is concentrated at the deltas and in the estuaries, but in addition effects are usually transmitted along the coasts and sometimes far out to sea".[781] However, from our research point of view, that situation forms the centre of attention when marine pollution is caused by watercourses, more specifically international watercourses involving, among others, land-locked states. The regulation of this situation is especially *challenging as*

"the pollution or other damage-causing activity may originate far upstream, or result from a toxic combination of pollutants introduced in the territories of two or more system States, and because the damage is not limited to the freshwater system".[782]

Consequently, controlling marine pollution from land-based sources, including watercourses, is a much more complex and challenging problem than regulating the operation of discharge of ships[783] or dumping. So, while certain topics relating to marine pollution has been regulated at universal level in binding documents, the challenges presented by marine pollution from land-based sources lack such kind of regulation. Moreover, on the one hand, not surprisingly, the usual debates between developmental and environmental priorities relating to economic, social and political implications take place among the developed and developing countries.[784] On the other hand, strongly connected to the previous train of thought, it is especially challenging "*to strike a balance between, on the one hand, the interests of coastal states and of the marine environment and, on the other, the rights and obligations of riparian states of international watercourses*". [785]

In order to illustrate these different interests concerning the freshwater (or more specifically the international watercourse)/maritime water interface, three types of states have to be differentiated. First, those coastal states have to be mentioned who are riparian states as well such as Germany (River Elbe and the North Sea) or Romania (River Danube

[781] A/CN.4/348 and Corr.1., Third report on the law of the non-navigational uses of international watercourses, by Mr. Stephen M. Schwebel, Special Rapporteur, *Extract from the Yearbook of the International Law Commission*, 1982, Vol. II(1), para. 303.
[782] Ibid., para. 329.
[783] A.E. Boyle, 'The law of the sea and international watercourses: an emerging cycle' *Marine Policy*, Vol. 14, No. 2, 1990, p. 151.
[784] Ibid. p. 152.
[785] A. Nollkaemper 'Legal Protection of the Marine Environment from Pollution of International Watercourses: Recent Developments', *Marine Pollution Bulletin*, Vol. 26, No. 6, 1993., p. 298.

and the Black Sea). Second, those riparian states have to be referred to who are not coastal states such as Hungary as a riparian state of the River Danube, but it does not belong to the coastal states of the Black Sea. Third, those groups of countries have to be noted who are coastal states such as Denmark, however, they are not riparian states of the international watercourse adversely affecting them. Those states should be granted a right to participate in the negotiations concerning the watercourse in question,[786] e.g. Denmark in terms of River Elbe.

4.6.2. The regulation of pollution from land-based sources at universal level

In order to have a proper view relating to the marine pollution from land-based sources, we will shortly examine the provisions of the relevant conventions adopted at universal level, namely the UNCLOS, the Watercourses Convention and the Water Convention.

Starting with Article 207 of the UNCLOS on Pollution from land-based sources, it states that

"States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures, taking into account internationally agreed rules, standards and recommended practices and procedures".

First, we have to note that Article 207 refers to 'States', so its scope is not limited to coastal States. As mentioned before, this approach can be justified by the fact that the impacts of the international watercourses as well as the emission into the atmosphere from non-coastal states on the quality of the marine environment. In addition, despite adopting this general term, land-locked states have no influence on the regulation of certain questions such as direct discharge from the coast.

Second, relating to 'laws and regulations' it can be noted, on the one hand, that it is not indicated at which level these 'laws and regulations' have to be adopted; however, as referred earlier, all levels can be relevant. On the other hand, using both terms may refer to fact that depending the topic in question, the adoption of both binding and non-binding can be satisfactory. In addition, in order to continue our train of thought, we have to refer to the "internationally agreed rules, standards and recommended practices and procedures", as can be seen, it is also a tricky phrasing and as was the case with 'laws and regulations' it ensures flexibility in terms of regional differences based on the different

[786] Ibid. p. 301.

characteristics of certain regions as well as concerning the different development level of the states.

Finally, we have to revoke that similarly to Article 21(2) of the Watercourses Convention, the Water Convention as well as Article 194 of the UNCLOS, Article 207 of the UNCLOS also opted for imposing the obligation to "prevent, reduce and control pollution," nonetheless we have discussed everything we wished relating to these obligations.

Moving onto Article 23 of the Watercourses Convention on Protection and preservation of the marine environment, it declares that

"Watercourse States shall, individually and, where appropriate, in cooperation with other States, take all measures with respect to an international watercourse that are necessary to protect and preserve the marine environment, including estuaries, taking into account generally accepted international rules and standards".

Before having a deeper look at this article, it has to be highlighted that the reason behind devoting a separate article to this topic was that a

"watercourse State could conceivably damage an estuary through pollution of an international watercourse without breaching its obligation not to cause significant harm to other watercourse States",

nonetheless, it is worth noting that even though Article 23 is "separate from, and in addition to" the obligations laid down in Article 20, 21 and 22 of the Watercourses Convention.[787]

In scrutinizing the elements of Article 23 one by one, first, we have to note, on the one hand, that the Draft articles contained the phrasing "individually or jointly" as was the case with Article 20 and 21(2) of the Watercourses Convention. As confirmed by the Commentary of the Watercourses Convention, all of them had the same meaning.[788] However, in adopting the Watercourses Convention, in Article 20 and 21 this was slightly modified to "individually and, where appropriate, jointly" which presumes, on the one hand, that it is not always required to have a joint action. On the other hand, especially relating to Article 21(2), though watercourse States are obliged to "prevent, reduce and control the pollution of an international watercourse" in general; in practice these

[787] Commentary of the Watercourses Convention, 1994, p. 124.
[788] Commentary of the Watercourses Convention, 1994, p. 125.

obligations concern watercourse States belonging to the same river basin, not the watercourse States in general. As can be seen, Article 23 opted for the wording "individually and, where appropriate, in cooperation with other States". Referring to the States instead of the watercourse States can be in harmony with the fact that those countries being affected by marine pollution via international watercourses are not necessarily watercourses States, not to mention they are not necessarily party of the Watercourses Convention. Indeed, opting for the term 'States' does not presume being party to the Watercourses Convention. This approach seems to be justified, on the one hand, by the fact the pollution of the marine environment and especially of the coastal waters affects the situation of the coastal states. On the other hand, we have to recall that a group of countries lacks transboundary watercourses, but they are affected by marine pollution via international watercourses. In addition, a final remark relating to our train of thought is that in harmony with the different character of Article 23, the term 'cooperation' suggest that Article 23 prescribes a less strict obligation compared to Article 20 and 21 of the Watercourses Convention.

Second, when it comes to the phrase "take all measures", the Commentary of the Watercourses Convention confirms that it has the same meaning as in Article 22; however, in addition, it is mentioned that the measures have to be "capable, financially and technologically".[789] Furthermore, concerning "to take all measures necessary" in Article 22 it is indicated that

"The obligation is one of due diligence, and will not be regarded as having been breached if a watercourse State has done all that can reasonably be expected to prevent the introduction of such species".

Additionally, the phrasing "with respect to international watercourses" clarifies that pollution of the marine environment via national watercourses as well as the pollution from any other sources are excluded under the scope of Article 23.

Third, as also confirmed in the Commentary of the Watercourses Convention concerning the obligations to "protect and preserve" these obligations mean the same thing as Article 20 of the Watercourses Convention.

Furthermore, as was the case with the UNCLOS, Article 23 also opted for the term 'marine environment', which is clarified in the article just like in the UNCLOS that

[789] Commentary of the Watercourses Convention, 1994, p. 125.

"marine environment, including estuaries", so, those observations mentioned relating to the relevant provisions of UNCLOS are also applicable here.

Finally**,** unlike the Watercourses Convention, the Water Convention did not devote one single article to the marine pollution; however, several provisions refer to this question. Starting with the Preamble of the Water Convention, the following statement can be detected

"Emphasizing the need for strengthened national and international measures to prevent, control and reduce the release of hazardous substances into the aquatic environment and to abate eutrophication and acidification, as well as pollution of the marine environment, in particular coastal areas, from land-based sources."

As can be seen, and in harmony with the fact that this statement can be found in the Preamble, it is a mere declaration of intent to "prevent, control and reduce" (…) "pollution of the marine environment, in particular coastal areas, from land-based sources".

Moving onto, Article 2(6) of the Water Convention, it stipulates that

"The Riparian Parties shall cooperate on the basis of equality and reciprocity, in particular through bilateral and multilateral agreements, in order to develop harmonized policies, programmes and strategies covering the relevant catchment areas, or parts thereof, aimed at the prevention, control and reduction of transboundary impact and aimed at the protection of the environment of transboundary waters or the environment influenced by such waters, including the marine environment".

This paragraph regulates the different manners and ways in which riparian States have to cooperate. In Article 2(6) the protection of the marine environment is additionally added as part of the "protection of the environment of transboundary waters or the environment influenced by such waters".

Finally, Article 9(4) of the Water Convention states that

"Joint bodies according to this Convention shall invite joint bodies, established by coastal States for the protection of the marine environment directly affected by transboundary impact, to cooperate in order to harmonize their work and to prevent, control and reduce the transboundary impact".

In other words, it is a procedural rule relating to cooperation. Based on the wording of the paragraph, it may be interpreted a rather less strict way, though referring this topic can have a relevance depending on the will and the interest of the states.

5. Conclusions

After scrutinising and analysing the rules governing freshwater as well as marine pollution at universal level, our time has come to summarise the most important findings of our research. At the outset we formulated three research questions. Now we will reiterate them one-by-one and endeavour to answer to all of them.

The *first research question* aimed to find out the meaning of the 'pollution of the international watercourses' under Article 21(1) of the Watercourses Convention as well as the meaning of the related obligations under Article 21(2), namely the obligations to prevent, reduce and control the pollution of the international watercourses. Notwithstanding, before starting our analysis relating to Article 21 of the Watercourses Convention, we have to make a mention of Article 20 on Protection and preservation of ecosystems as the ILC was of the opinion that this article, which lays down a general obligation, should precede the more specific articles of Part IV on Protection, Preservation and Management of the Watercourses Convention including Article 21. As such, we need the key message of Article 20 in order to correctly interpret Article 21.
Article 20 prescribes that *"Watercourses States shall (...) protect and preserve the ecosystems of international watercourses"*.
Regarding this article, first, the term 'ecosystems' has to be referred to that means "*an ecological unit consisting of living and non-living components that are interdependent and function as a community*" of which an important feature is that "everything depends on everything else and nothing is really wasted".[790] Second, Article 20 establishes two cumulative obligations concerning the ecosystems, namely the obligations to protect and preserve. As stated in the Commentary of the Watercourses Convention, the obligation to protect requires the watercourses States to "shield the ecosystems of international watercourses from harm and damage". As such, it prescribes more than protection against pollution; moreover, States are required to be proactive and take measures to protect the ecosystems. Further, the obligation to preserve primarily refers to those ecosystems that are in a "pristine or unspoiled condition" and it aims to maintain their natural state. Notwithstanding, the evaluation of all relevant factors will determine whether or not there is an interest in preserving these ecosystems. As can be seen, a distinction can be observed based on the state of the ecosystem; however, when deciding whether they wish to

[790] Commentary of the Watercourses Convention, 1994, p. 118.

preserve an ecosystem its special condition is merely one factor. Our final remark relating to the said obligations that those are obligation of due diligence.

Armed with this information, we can turn our attention to Article 21. Article 21(1) on the 'pollution of international watercourse' stipulates that

"pollution of an international watercourse means any detrimental alteration in the composition or quality of the waters of an international watercourse which results directly or indirectly from human conduct".

Our starting point concerning this paragraph is the Commentary of the Watercourses Convention that confirms that even though the basic elements can be found in this phrasing, but it is "more general in several respects".[791] That can result in a broad margin of interpretation. As such, it is vital to disclose the proper meaning of the 'pollution of the international watercourses'.

In examining this paragraph, first, it is conspicuous that it does not specify the threshold and declares the general prohibition of water pollution. However, it is highly unlikely that pollution *per se* would be prohibited under the international law, further, this approach would stand in sharp contrast with the findings of the environmental economics. Moreover, it can be argued that even in default of threshold it is possible to explain and evaluate this paragraph thanks to Article 20. Second, concerning 'detrimental alteration' we have to confirm that it covers both physical and chemical pollution; however, biological pollution does not fall under its scope as Article 22 on Introduction of alien or new species is devoted to it. Third, the terms 'composition or quality of waters' are alternatives, so a detrimental alteration in one of them is sufficient to meet the requirements of this paragraph. Under the term 'composition' based on the Commentary of the Watercourses Convention we understand "all substances contained in the water, including solutes, as well as suspended particulate matter and other insoluble substances", whereas it follows from an earlier draft the term 'substances', cannot be interpreted to include plants, animals and other living organisms. Further, the phrase 'water quality' is used to describe the physical, chemical and biological characteristics of water and we can refer to pollution when the water has more negative qualities than positive ones. In addition, the adoption of the term 'result' may suggest that the only important factor

[791] Draft articles on the law of the non-navigational uses of international watercourses and commentaries thereto and resolution on transboundary confined groundwater, adopted by the International Law Commission at its forty-sixth session in 1994, *Yearbook of the International Law Commission*, 1994, Vol. II, Part Two, p. 121.

regarding this obligation is the outcome, so the way or manner by which it was triggered is not relevant. Indeed, there is no reference to certain ways such as introduction or discharge into water or to certain sources, such as industries, agriculture or households. Moreover, the phrase 'directly or indirectly from human conduct' can be interesting from several perspectives. On the one hand, the term 'human conduct' is supposed to cover both acts and omissions. On the other hand, it covers the use of water by man and the negative effect of those activities on water for which humans are responsible. When it comes to the phrases directly or indirectly, it has to be pointed out that under the term directly we understand the straight-line relationship between the human conduct and the pollution, whereas regarding indirectly it is not possible to establish such an unambiguous link between them such as the sediments in the river as a result of deforestation.

Turning our attention to Article 21(2), the first part of this paragraph stipulates that

"Watercourse States shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution of international watercourses that may cause significant harm to other watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse".

Regarding this paragraph, first, the obligations to prevent, reduce and control of the pollution will be discussed. As indicated in the Commentary of the Watercourses Convention, these obligations refer to the varying water quality of the international watercourses. While the obligation to 'prevent' relates to 'new pollution' of international watercourses, the other obligations, such as the obligations to 'reduce and control' refer to 'existing' ones. Moreover, the obligations to 'reduce and control' pollution also reflect that state practice that even significant pollution has to be tolerated by those countries where polluted rivers are situated provided if the polluter state is doing everything to reduce the pollution to a mutually acceptable level. Additionally, concerning the obligation to 'prevent', it has to be noted, as suggested when discussing rivers bank as a border that countries without watercourses are also obliged to take measures to prevent pollution e.g. from agricultural source or accidental pollution that can pollute the waters of the neighbouring state. Second, this paragraph contains the threshold, namely significant harm. It can be decided case-by -case basis whether a harm is significant or not. Trivial cases definitely do not fall under its scope, the harm has to negatively affect certain water uses or any other elements related to the non-exhaustive list of significant harm. In addition to significant harm, we have to refer to the river borders once again, as

can be seen, the fact that the pollution crosses the state border is a necessary, but not satisfactory element of pollution under Article 21 as causing or having the possibility to cause significant harm is also required. Third, the phrase 'may cause' is strongly related to the significant harm. It refers to the precautionary principle and as stated in the Commentary of the Watercourses Convention, it is primarily related to the 'dangerous substances'. Furthermore, as was the case with the obligations in Article 20, the obligations under Article 21 are also obligation of due diligence. Nonetheless, the degree of diligence depends on how hazardous the substances are as well as on the potential impact of the activity on water. Lastly, as mentioned before a non-exhaustive list can be found relating to significant harm.

The *second research question* is connected to the examination of the relationship between the Watercourses Convention and the Water Convention. This analysis can be justified by the unique situation characterized by McCaffrey as "unprecedented in the annals of international law"[792] has emerged, namely two multilateral treaties covering the same subject matter, the Water Convention[793] and the Watercourses Convention[794] entered into force.[795] Moreover, the fact that only the Watercourses Convention provides a definition of water pollution, although both Conventions refer to this term, provides an opportunity to examine the relationship between the two documents. When it comes to their relationship the two Conventions can be compared, among others, on the basis of three aspects. First, it can be identified that both of them are framework conventions; however, Water Convention contains more detailed provisions compared to an average framework convention. Second, in terms of their geographic scope we can conclude that Watercourses Convention covers groundwater as far as it is connected to surface water, whereas the Water Convention covers both confined and unconfined aquifers, and transboundary waters which end in a desert sink or in an enclosed lake. Third, it has to be stressed regarding the traditional differentiation between the 'economic cast' of the Watercourses Convention compared to the environmental approach of the Water

[792] S.C. McCaffrey, The 1997 UN Convention: Compatibility and Complementarity, *in* Tanzi *et al.* (Eds.), *The UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes: its contribution to international water cooperation*, Brill Nijhoff, Leiden, Boston, 2015, p. 51.
[793] Convention on the Protection and Use of Transboundary Watercourses and International Lakes, adopted on 17 March 1992 in Helsinki and entered into force on 6 October 1996.
[794] Convention on the Law of the Non-Navigational Uses of International Watercourses, adopted on 21 May 1997 in New York and entered into force on 17 August 2014.
[795] See; A. Tanzi, *The Economic Commission for Europe Water Convention and the United Nations Watercourses Convention An analysis of their harmonized contribution to international water law*, Water Series № 6, United Nations, New York, Geneva, 2015, p. 3.

Convention that, on the one hand, economic and the environmental interests are inseparable. On the other hand, the Watercourses Convention was adopted with the aim to regulate the non-navigational uses of the international watercourses, nonetheless, it contains numerous environmental provisions. Although the UNECE was established with economic goals, it has adopted several environmental conventions, among others, the Water Convention.

If we narrow down our examination and put the provisions of the two Conventions under our microscope, we can see that the provisions of the Watercourses Convention and the Water Convention not only coincide, but further contribute to the clarification and unification of the term water pollution in the aforementioned Conventions. This situation can be explained, firstly, by the fact that the Watercourses Convention provides a definition on pollution, which is very similar to the definition on pollution in the Convention on Long-range Transboundary Air Pollution, adopted under the auspices of the UNECE, just like the Water Convention, i.e. there is a synergy between them. Secondly, based on the analysis of the Water Convention, one can conclude that even though it lacks a precise definition, but it contains numerous provisions on water quality, which definitely result in a clear idea on water pollution, especially in light of the interpretation of the Watercourses Convention relevant provisions. Finally, it is worth noting that the Water Convention can also contribute to the clarification of the Watercourses Convention thanks to its numerous provisions on water quality as well as to the non-binding instruments relating to the Water Convention.

The *third research question* wished to disclose the meaning of the 'pollution of the marine environment' under Article 1(4) of the UNCLOS as well as to examine the relationship between Article 21 of the Watercourses Convention on Prevention, reduction and control of pollution, and Article 1(4) as well as Article 194(1) of the UNCLOS. It is especially inspiring to analyse this relationship as Article 21 of the Watercourses Convention was modelled on Article 1(4) and Article 194 of the UNCLOS.

As was the case with our first research question, first, we have to refer to another obligation, namely Article 192 of the UNCLOS on Protection and preservation of the marine environment. Article 192 stipulates that

"States have the obligation to protect and preserve the marine environment".

As can be seen, Article 20 of the Watercourses Convention and Article 192 of the UNCLOS establish the same obligations, namely to obligation to protect and preserve

with the same meaning; however, Article 192 refers to the marine environment, whereas the Watercourses Convention refers to the ecosystems. It is an interesting choice as, on the one hand, the term marine environment is not defined. however, it is supposed to be narrower than the environment and as indicated in Article 1(4) of the UNCLOS the marine environment includes the estuaries. On the other hand, the Regional Seas Conventions are in favour of referring to the ecosystem. Nonetheless, compared to Article 20 of the Watercourses Convention, these are limited in terms of their location such as marine and coastal ecosystems, further, ecosystems with special state are stressed such rare, fragile or vulnerable ecosystems.

Moving onto Article 1(4) of the UNCLOS regarding the pollution of the marine environment, as indicated in the said article is

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

First, it can be observed that contrary to the Watercourses Convention, Article 1(4) of the UNCLOS determines how the pollution can be caused, namely by introduction. Nonetheless, the term 'introduction' encompasses practically every activity causing pollution, among others, discharge, emission or dumping. Second, the word 'man' must have the same meaning as human conduct in the Watercourses Convention, though the wording of the UNCLOS is supposed to be more general. Third, regarding the direct and indirect introduction, the differentiation seems to be clear, as apart from the pollution through river flows and the pollution from or through the atmosphere, the introduction from the other sources, such as pollution from seabed activities subject to national jurisdiction, the pollution from activities in the Area, the pollution by dumping and the pollution from vessels can be evaluated as direct ones. Further, the precautionary principle can be identified as it follows from the phrase 'likely to result', in other words, the probability of the pollution is sufficient. In addition, regarding the term 'substance' as was the case with the Watercourses Convention, biological pollutions do not fall under the scope of Article 1(4) of the UNCLOS, but it is regulated under Article 196 of the UNCLOS. Moreover, under the term 'energy', we generally understand noise pollution concerning the marine environment compared to thermal pollution in the Watercourses Convention. Finally, as was the case with Article 21(1) of the Watercourses Convention

relating to the significant harm, some examples are shared in Article 1(4) of the UNCLOS relating to the deleterious effects.

Turning our attention to Article 194(1) of the UNCLOS on Measures to prevent, reduce and control pollution of the marine environment, first, it has to be declared that

"States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection".

We have discussed the obligations to prevent, reduce and control pollution relating to Article 21(2) of the Watercourses Convention, the same ascertainments are applicable to this paragraph. Nonetheless, based on the Regional Seas Conventions it can be concluded that several conventions supplemented these obligations with new ones such the obligation to abate pollution or terminate pollution that presents new shades to these obligations.

Lastly, the phrase "the best practicable means at their disposal and in accordance with their capabilities" will be examined. While the first part of this phrase may reflect the special characteristics of each sea basin, which claim different technical approaches and solutions, whereas in the second part the word 'capabilities' may refer to both technical and financial differences of the states. Although it can be argued that the phrase "at their disposal" may also involve reference to the differences in the financial opportunities of certain states and regions.

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4. Bilateral documents

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