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The Sound of One Hand Clapping: Limitations to Integrated Resources Water Management in the Dead Sea Basin

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I. INTRODUCTION- INSTITUTIONAL CAPACITY FOR GOVERNANCE OF THE DEAD SEA BASIN

Left alone, running water flows in channels dictated by principles of hydrology, not political boundaries. In the Dead Sea Basin, the natural course of running water has been disrupted to meet political exigencies. What politicians in Lebanon, Syria, Jordan and Israel thought would meet their constituency's needs has caused serious ecological deterioration at the lower end of the Basin: the Dead Sea and its surrounding area. The past decision-making process (the sound of one hand clapping) may soon repeat itself. Jordan and Israel have made a joint announcement supporting a "peace canal" to bring water from the Red Sea to the Dead Sea to recharge the Dead Sea and supply drinking water to Jordan.¹ Yet this announcement preempted a study of the legal, economic, social, and ecological consequences of another political announcement reversing the natural flow of water. The joint announcement highlights the urgent need for proper governance of the Basin. Yet, intelligent management and sustainable development of the Dead Sea can occur only if all the riparians of the Basin are involved in its management.

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1. At the World Economic Forum, held in Jordan at the Dead Sea in May 2005, ministers from Jordan, Israel and the Palestinian Authority agreed on a \$20 million feasibility study to build a canal from the Red Sea to the Dead Sea. *See Report From the World Economic Forum at* http://www.weforum.org/site/homepublic.nsf/Content/_S14730 (last visited Apr. 17, 2005).

Creating a legal framework to reverse the ecological deterioration of the Dead Sea is quite difficult, especially due to the regional political situation. That said, there are numerous places in the world, where in spite of ongoing conflict, there is discussion, debate, and joint management of water resources. Israel and its neighbors have begun the initial stages of institutional capacity building for governance of water, an objective that is necessary in order to avoid conflict.²

This article will discuss the effects of humans on the unique ecosystem of the Dead Sea. It will show how poor management of an international lake has led to environmental degradation of catastrophic proportions. After presenting the geological and political background to the Dead Sea's present state, the article will present a model of governance based on both national and international water laws. Finally, the article will suggest a system of integrated water resource management to be implemented by a proposed Dead Sea Basin Commission.

II. GEOLOGICAL AND HYDROLOGICAL PERSPECTIVE

A. Description of the Afro-Syrian Rift

Over 100 million years ago there was a flat plane of land from the Euphrates Valley extending to the Mediterranean Sea. Waters beginning in Iran and Iraq flowed in a gentle slope across this large expanse to the Mediterranean Sea. One hundred million years ago, the Afro-Syrian rift began to develop and divided the area in two, extending from Eastern Africa to Syria. Within that rift a river system, known as the Jordan River Basin, or the Dead Sea Basin, was created. The Basin begins in the hills of Israel, Lebanon, and Syria, flowing into the region's largest freshwater lake, the Sea of Galilee,³ into the lower Jordan River, and ending in the Dead Sea.⁴

2. Aaron T. Wolf *et al.*, *International Waters: Identifying Basins at Risk*, 5 WATER POL'Y 29 (2003), available at http://www.transboundarywaters.orst.edu/publications/Wolf_et_al_Water_Policy_BAR.pdf.

3. Also known as the Kinneret and Lake Tiberias. In this article, many of the places have more than one name. The authors have tried to use the most common name.

4. Richard E. Laster, *Lake Kinneret and the Law*, 12 ISR. L. REV. 288, 290 (1977).

The Dead Sea is a unique body of water. It is the lowest place on earth, with the highest salt content of any body of water.⁵ It is a terminal lake, having no outlet other than evaporation. The area's historical value is astounding, and the list of sites found in the region includes Qumran, Ein Gedi, Sodom, Masada, Jericho, Jesus' baptism site, and Mount Nebo.

The Dead Sea Basin maintains a unique ecosystem, that contains biological and botanical specimens that are found nowhere else in the world, and provides a rest stop for thousands of migratory birds.⁶ In addition to this rich variety of historical and natural bounty, the warm desert climate, the mineral-laden waters and mud, and the thermal springs attract tourists to the hotels and resort areas in Israel and Jordan. Alongside those cultural riches, two huge potash industries call the lower portion of the Dead Sea "home," extracting four million tons of potash each year.

B. Hydrological Overview

For the past fifty years, the countries that withdraw water from the Jordan River network have reduced the inflow of water into the Dead Sea from an annual recharge of 1,600 million cubic meters per year to 400 million cubic meters per year.⁷ Syria uses 200 million cubic meters per year from the Yarmuk River. Lebanon uses twenty million cubic meters from the Hatzbani (one of the upper tributaries of the Upper Jordan River).⁸ Israel uses 600 million cubic meters of the waters of the Upper Jordan, the Sea of Galilee, and the Western Lower Jordan River tributaries.⁹ Jordan uses 350 million cubic meters of the Yarmuk and the Eastern Lower Jordan tributaries.¹⁰ As a result, the level of the Dead Sea is presently falling at the rate of approximately one meter a year.¹¹ This figure is increasing, due to the additional diversion of natural tributaries.

5. The level of the Dead Sea is presently at 416 meters below sea level, and is expected to reach 430 by the year 2020. The salinity of the Dead Sea in the upper water layer is about ten times that of the Mediterranean Sea or about 30%.

6. See ELI RAZ, *THE DEAD SEA BOOK* (Israel Nature Reserves Authority 1993) (in Hebrew) (providing a detailed overview of the Dead Sea).

7. HAIM GVIRTZMAN, *ISRAEL WATER SOURCES, CHAPTERS IN HYDROLOGY & ENVIRONMENTAL SCIENCES*, (Yad Ben Zvi Press 2002) (in Hebrew).

8. *Id.*

9. *Id.*

10. *Id.*

11. Israel Government Decision No. 2863 of Jan. 5, 2003 (in Hebrew) [hereinafter *Dead Sea Government Report*]. The decision describes the problems facing the Dead Sea, its environment, and the interested parties. The government set up a committee

The loss of water has caused numerous side effects.¹² Beginning in the late 1970's, holes as large as eleven meters in depth and twenty-five meters in diameter began to appear along the shoreline.¹³ These sinkholes result from the collapse and sinking of the uppermost sedimentary section of earth into underlying cavities that apparently developed because of the dissolution of the subterranean salt layer. As the Dead Sea's water level declines, there is a corresponding drop in the underground salt water table. Fresh water moves into its place, dissolving the salt deposits that support the ground above. Over 1,000 sinkholes have appeared, endangering both people and property, and the phenomena is continuing.¹⁴

The Dead Sea area is also known for its sudden flash flooding. As the coast recedes, the floodwaters eat away at the newly uncovered earth. The erosion is continuously moving up the streams and wadis, undermining bridges and roads and causing them to collapse.¹⁵

In some places, tourist facilities once on the coast are now hundreds of meters from the sea, and exposed mudflats make access to the sea difficult.

The springs and freshwater sources along the Dead Sea coast are also affected by the changes in the groundwater level. Some of the springs have moved, and it is feared that they may dry up completely. This would destroy unique ecosystems and deprive migratory species and local fauna of fresh water.¹⁶

A separate problem is the flow of sewage into the Dead Sea. Twenty million cubic meters of sewage reach the Dead Sea every

to explore in detail the problems and the possible scenarios for the future, and to compile a report on their findings. The authors are members of that committee. An English summary is available at http://www.sviva.gov.il/Environment/static/Binaries/Articals/deadSea_eng_1.pdf. See also Israel Ministry of the Environment, *Saving the Dead Sea*, at http://www.environment.gov.il/Enviroment/bin/en.jsp?enPage=E_BlankPage&enDisplay=View&enDispWhat=Object&DispWho=Articals^12057&enZone=Water_Sources (last updated May 17, 2004) [hereinafter Israel Ministry of the Environment].

12. Dead Sea Government Report, *supra* note 11.

13. *Id.* See also Eli Raz, *Development of Sinkholes Along the Dead Sea Coast: Summary of the Surface Survey, Reporter no. 2, for the period Nov. 1998-June 1999*, 67 *Isr. Geol. Surv. Rep. GSI/31/2000* (in Hebrew).

14. For example, due to the appearance of numerous sinkholes, Kibbutz Ein Gedi has been forced to close part of their date plantation and camping area.

15. On May 2, 2001, the bridge over the Arugot stream was completely destroyed by flooding. Its temporary replacement was washed out on December 4, 2001.

16. Dead Sea Government Report, *supra* note 11.

year from Jerusalem and other towns within both Palestinian and Israeli controlled areas, the majority of which is untreated.

In 1977 the falling sea level caused the southern part of the Dead Sea to separate from the northern part. It would have dried up completely, but the Israeli and Jordanian potash industries began pumping water through a channel that connects the Northern portion with the Southern. The Southern Dead Sea now serves both as a tourist site for bathers and as an extraction site for minerals. Both potash companies use the sun as a source of energy for this extraction process, which increases the total Dead Sea water loss by approximately twenty percent.¹⁷ They also leave behind unwanted salt deposits, which build up on the Southern Sea bottom at a rate of twenty centimeters per year. In both Israel and Jordan, the water in the Southern, artificial part of the Dead Sea is now kept in place by huge earthen dikes, which must be continuously raised in order to keep up with the salt buildup. Failure to do so will cause flooding of the hotels, located on the "beach," which in essence is an extraction pond.

III. POLITICAL/HISTORICAL PERSPECTIVE: PROBLEMS OF GOVERNANCE OF THE DEAD SEA

A. Attempted Regional Water Agreements

The problems discussed above relating to the ecological status of the Dead Sea have resulted from a lack of governance by an international body. Attempts have been made in the past to reconcile water rights and needs among the riparians in the Jordan River Basin.¹⁸ One of the first plans to solve the water conflict in the Middle East was designed during the period of Ottoman control of Palestine.¹⁹ The purpose of the Franghia Plan of 1913 was to use the Jordan for irrigation and to create electricity.²⁰ The plan collapsed with the fall of the Ottoman Empire.²¹

17. Israel Ministry of the Environment, *supra* note 11. Two international companies, the Dead Sea Works in Israel and the Arab Potash Company in Jordan, have divided up the southern section of the Sea into evaporation ponds. The extraction process, while energy conserving, withdraws 300 million cubic meters of water from the Dead Sea annually.

18. See THOMAS NAFF & RUTH C. MATSON, *WATER IN THE MIDDLE EAST: CONFLICT OR COOPERATION?* 17-45 (Westview Press 1984)

19. *Id.* at 30.

20. *Id.*

21. *Id.*

In 1944, at the request of the British Mandatory Government, Professor W.C. Lowdermilk developed a plan that was based on the Tennessee Valley Authority (TVA).²² The plan included diverting the waters of the Litani and Jordan Rivers to irrigate the Negev desert and building a canal from the Mediterranean to replenish the Dead Sea.²³ This plan also collapsed, due to post-World War II developments and the creation of the State of Israel.²⁴

From 1948, each riparian country acted unilaterally, withdrawing water as it required. In 1953 the United Nations Relief and Works Agency (UNRWA) asked Charles Main to create a plan for dividing the regions water sources. In response to Main's plan, Israel presented a plan of her own, the Cotton Plan, while the Arab League presented the Arab Plan.

The Johnston Plan was the result of the United State's shuttle diplomacy among representatives from Israel, Lebanon, Jordan, and Syria, conducted between 1953 and 1956.²⁵ The plan, based largely on the Main Plan, divided up the area's water sources, and although rejected by the Arab League and thus never ratified by the Arab riparians, has stood as a recognized guide for allocations ever since.²⁶ The plan gave Israel use of the Sea of Galilee as a national reservoir, Jordan and Syria the use of the waters of the Yarmuk River, and Jordan the use of the Lower Jordan River.

These attempts may have prevented outright conflict over water rights, but they have not served as models of effective water management.²⁷ They have not succeeded in creating a system of governance that could have prevented serious ecological degradation of the region.²⁸ The price paid for a lack of a water management framework comes at the expense of the Dead Sea and its surrounding ecosystem.

We can learn from these failures the following lesson: goodwill in the international community is an important element in

22. *Id.* at 32.

23. *Id.*; Tennessee Valley Authority, at http://campusprogram.com/reference/en/wikipedia/t/te/tennessee_valley_authority.html (last visited Nov. 2, 2004) (stating by the end of World War II, the TVA had built a 650-mile (1,050-kilometer) navigation channel the length of the Tennessee River).

24. See NAFF & MATSON, *supra* note 18, at 40-41.

25. See *id.*

26. See *id.* at 41

27. See *id.* at 17-45.

28. *Id.*

conflict resolution concerning an international water body, yet by itself is insufficient. If the riparians do not act together, no amount of goodwill from outside can result in good management practices. This is true because water needs are dynamic, and developing a plan as a guide for allocations is only one facet of water resource management. A body must be created to develop and implement the plan, and its governance.

B. Israel and the Palestinians

Until 1967, allocation of water in the Jordan Basin by the riparian states more or less followed the Johnston Plan.²⁹ Since the Six Day War, Israel has occupied additional areas riparian to the Dead Sea. As an occupying power under International Law, Israel has a duty to maintain existing law, a duty to uphold law and order, and the right to pass legislation necessary to fulfill that duty.³⁰ Since Jordanian Law was in force when Israel took control of the West Bank, it remains in force unless new legislation has been passed in its stead.³¹

In 1993, Israel and the Palestinian Authority signed the Oslo I Accords in the presence of President Clinton.³² The principles in the agreement included cooperation in the field of water, calling for a water development program, developing methods of cooperation in water management, and plans for the equitable utilization of joint water resources.³³

29. See *id.* at 44-45.

30. Geneva Convention Relative to the Protection of Civilian Persons in Time of War, Aug. 12, 1949, art. 47-78, 75 U.N.T.S. 287; Hague Convention (IV) Respecting the Laws and Customs of War on Land and its Annex: Regulations Concerning the Laws and Customs of War on Land, Oct. 18, 1907, art. 42-56, 36 Stat. 2277 [hereinafter Hague IV].

31. While Jordan's previous sovereignty over the West Bank has been questioned, this is not of consequence as far as military rule is concerned. The occupying power must respect the law that was in force in the administered territory, unless absolutely prevented from doing so. Hague IV, *supra* note 30, art. 43.

32. Declaration of Principles on Interim Self-Government Arrangements, Sept. 13, 1993, Isr.-P.L.O., 32 I.L.M. 1525 [hereinafter Declaration of Principles on Interim Self-Government Arrangements]. See also, GEOFFREY R. WATSON, THE OSLO ACCORDS: INTERNATIONAL LAW AND THE ISRAELI-PALESTINIAN PEACE AGREEMENT, app. B at 317 (2000).

33. Declaration of Principles on Interim Self-Government Arrangements, *supra* note 32, annex III.

Cooperation in the field of water, including a Water Development Program prepared by experts from both sides, which will also specify the mode of cooperation in the management of water resources in the West Bank and Gaza Strip, and will include proposals for studies and plans on

Two years later the Oslo II Accords were signed.³⁴ This agreement changed the legal status in the West Bank by creating three different areas: Area "A", under total control of the Palestinians; Area "B", where security is under Israeli control and civil services are under Palestinian control and Area "C", under full Israeli control.³⁵ Area "C" includes a portion of the area bordering the Dead Sea, which is known as the Megillot Regional Council. The closest Palestinian-controlled area to the Dead Sea is the town of Jericho, which is also the largest population center in the area with approximately 32,000 inhabitants.³⁶

The Oslo II Accords address both water needs as well as water rights.³⁷ The agreement recognizes Palestinian rights to water in the West Bank, the details of which are to be decided in a final accord. The sides set up a Joint Water Committee, whose role is to discuss all issues concerning management of water and sewage, including common management of water sources and their protection.³⁸

The Oslo II Accords are an interim agreement, with the final agreement yet to be concluded. Without a final status agreement, there are major difficulties in knowing what the Israeli and Palestinian roles are in the area. In spite of heightened tensions, the Israeli Palestinian Joint Water Committee continues to meet, although its agenda is limited mainly to solving problems concerning the supply of water. Since the Palestinians and the Israelis share many water sources, and thus the responsibility to protect them, it is imperative that the sides work together, regardless of future border considerations.

water rights of each party, as well as on the equitable utilization of joint water resources for implementation in and beyond the interim period. *Id.*

34. Israeli-Palestinian Interim Agreement on the West Bank and the Gaza Strip, Sept. 28, 1995, Isr.-P.L.O., 36 I.L.M. 551, 1997 [hereinafter Oslo II Accords]. *See also*, Matson, *supra* note 18, app. E at 349.

35. Oslo II Accords, *supra* note 34, art. 11. *See also* NAFF & MATSON, *supra* note 18, app. E at 355.

36. PALESTINE CENT. BUREAU OF STATISTICS, MID YEAR PROJECTED POPULATION IN THE PALESTINIAN TERRITORY BY GOVERNORATE, 1997-2004, at http://www.pcbs.org/populati/est_nl.aspx (last visited Oct. 12, 2004).

37. Oslo II Accords, *supra* note 34, art. 40. Principle 1 states that "Israel recognizes the Palestinian water rights in the West Bank. These will be negotiated in the permanent status negotiations and settled in the Permanent Status Agreement relating to the various water resources." Principle 6 provides that "Both sides have agreed that the future needs of the Palestinians in the West Bank are estimated to be between 70 - 80 mcm/year." *Id.*

38. *Id.*

C. Israel and Her Other Neighbors

With regard to the other riparians of the Dead Sea Basin, unstable relationships exist between Israel and Syria, and Israel and Lebanon. Conflicts have been reduced by cease-fire agreements with no protocol on water use.³⁹ In addition, there are no international agreements for water resource management. Jordan and Israel, however, signed a peace treaty in 1994 that recognizes the importance of ecological issues in the area and the need to protect the environment.⁴⁰ Like the Oslo Accords, the treaty creates a Joint Water Committee ("JWC")⁴¹ to reduce conflict over water rights (but not needs), and sets out particular details regarding the transfer of set amounts of water from one country to another. The Jordan-Israel Joint Water Committee, however, is not a management body, nor does it deal with a particular water body like the Dead Sea. The Jordan-Israel treaty gives little detail as to the powers of the JWC beyond monitoring of water flows and quality. In essence, the Committee is a bi-national political structure created to reduce conflict as a forum for dialogue between the states on issues concerning water.

Annex 4 of the Jordan-Israel treaty earmarks the Dead Sea as a special geographical area.⁴² The sides agreed to cooperate on area projects, including nature reserves, protected areas, tourism and heritage sites. They also agreed to join together in protecting

39. The major armistice, cease-fire, and separation of forces agreements include: Israel-Lebanon Armistice Agreement, Mar. 23, 1949, *Isr.-Leb.*, 43 U.N.T.S. 287; Israel and Syria General Armistice Agreement, July 20, 1949, *Isr.-Syria*, 42 U.N.T.S. 327, available at www.mfa.gov.il/mfa/foreign+relations/israels+foreign+relations+since+1947/1947-1947/israel-syria+armistice+agreement.htm; Israel and Jordan General Armistice Agreement, Apr. 3, 1949, *Isr.-Jordan*, 42 U.N.T.S. 303; U.N. Res. 338, Sec. Council, (1973), at <http://www.yale.edu/lawweb/avalon/un/un338.htm>; Separation of Forces Agreement between Israel and Syria, May 31, 1974, *Isr.-Syria*, available at www.mfa.gov.il/mfa/peace%20process/guide%20to%20the%20peace%20process/Israel-Syria%20seperation%20of%20forces%20agreement%20-%201974; Israel-Lebanon Ceasefire Understanding, Apr. 26, 1996, *Isr.-Leb.*, available at www.mfa.gov.il/mfa/peace%20process/guide%20to%20the%20peace%20process/israel-lebanon%20ceasefire%20understanding.

40. Treaty of Peace Between the State of Israel and the Hashemite Kingdom of Jordan, Oct. 26, 1994, *Isr.-Jordan*, art.18, at <http://www.sphr.org/peace/ijpeace.htm> (last visited Jan. 31, 2005). "The Parties will co-operate in matters relating to the environment, a sphere to which they attach great importance, including conservation of nature and prevention of pollution, as set forth in Annex IV." *Id.*

41. *Id.*, Annex II-Water, Article VII: Joint Water Committee.

42. *Id.*, Annex IV-Environment, D II 2- the Dead Sea. This section of the treaty briefly lists the areas of cooperation concerning the Dead Sea: (1) nature reserves and protected areas; (2) pest control; (3) environmental protection of water resources; (4) industrial pollution control; and (5) tourism and historical heritage.

the Dead Sea's water sources and nature reserves, as well as eliminating industrial pollution in the area. Yet the treaty does not set up a legal framework to implement these provisions. There is no mention of institutions, timetables, or rules of implementation, nor have the parties made any progress in doing so since the signing of the act.

Between 1992 and 1995 Israel, Jordan, and the Palestinian Liberation Organization held multilateral talks on several issues, including the environment and water. The parties recognized that these issues are not confined within the arbitrary borders of individual countries. The talks resulted in the formation of the Executive Action Team (EXACT) Multilateral Working Group on Water Resources, which in spite of the present political climate, continues to function.⁴³

IV. WATER LAW-DOMESTIC, INTERNATIONAL, ISRAELI, JORDANIAN, AND PALESTINIAN

The following two sections touch on relevant principles of domestic and international water law, respectively, to provide the reader with background. These international principles of management show that the international community has developed rules of governance of natural bodies of water. Yet these rules operate only in a framework created by the riparians of the body of water, and, to date, this framework does not exist in the Dead Sea Basin.

A. State Authority to Determine Water Rights and to Manage Water Needs

Water laws throughout time have enabled a state or a nation to create rules for just and efficient distribution of domestic water uses. One of the first such attempts was Roman Law which determined that no one had rights over flowing water; all forms of water, like air, the sea, and the shore of the sea, belong in the negative community (*res nullius*).⁴⁴ When can one get a property right over a water source? Roman Law's answer was only when one diverts the water and captures it in a reservoir, pipe, or conduit. But then who has the right to divert water? The answers to

43. See Executive Action Team (EXACT) Multilateral Working Group on Water Resources at <http://exact-me.org> (last visited June 6, 2004) (providing additional information on joint regional water projects and studies).

44. Samuel C. Wiel, *Running Water*, 22 HARV. L. REV. 190, 190-92 (1908-1909). See generally DAN A. TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 3 (2004).

these questions have served as the basis for domestic water law throughout the world.

Similar questions of diversion and pollution occur in international water bodies. Shared waters require national legal systems to take into account the rights and uses of neighboring states to avoid conflict. For this purpose, common principles of international law provide legal, political, and economic basis to share territorial waters. A state may claim absolute territorial sovereignty, or absolute territorial integrity, over the waters within its territory, thereby excluding neighboring states from its decision-making process. Yet since the heyday of the 'Harmon Doctrine,' limited territorial sovereignty and community of interests have become the more reasonable approaches.⁴⁵ In recent times, the objective in shared waters has been the creation of legal or institutional capacity in which riparians share knowledge and jointly manage an international water body.⁴⁶ The following section briefly surveys internationally recognized principles that limit state sovereignty and facilitate the use of shared water by more than one riparian state.

B. International Water Law

International water law is controlled by treaties and customary law. To date, the most relevant water treaty is the 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses ("NUIW").⁴⁷ The NUIW, together with the Helsinki Rules⁴⁸ and the Berlin Rules⁴⁹, have codified principles of international water law. These principles

45. See, e.g., Gabriel Eckstein, *Application of International Water Law to Transboundary Groundwater Resources and the Slovak-Hungarian Dispute Over Gabčíkovo-Nagymaros*, 19 SUFFOLK TRANSNAT'L L. REV. 67, 73 (1995). See also Thomas Naff, *International Riparian Law in the West and Islam*, 1993 INT'L SYMP. ON WATER RESOURCES IN THE MIDDLE E.: POL'Y AND INSTITUTIONAL ASPECTS PROC. 114 (OCT. 1993). The Harmon Doctrine "decrees that a riparian may do what it will with the water (or any resource) within its boundaries without constraints-use it up, pollute it, dam it, send it downstream in any quantity or condition" *Id.*

46. See Wolf, *supra* note 2.

47. *The Convention on the Law of the Non-Navigational Uses of International Watercourses: Report of the Sixth Committee Convening as the Working Groups of the Whole*, U.N. GAOR 6th Comm., 51st Sess., Annex I, Agenda Item 144, U.N. Doc. A/51/869 (1997) [hereinafter *NUIW*], available at <http://www.un.org/law/ilc/texts/nonnav.htm> (last visited Jan. 31, 2005). The U.N. General Assembly, on May 21, 1997, adopted the Convention with 103 votes for, three against, and 27 abstentions. See G.A. Res. 51/229, Annex I, 36 I.L.M. 700 (1997).

48. INTERNATIONAL LAW ASSOCIATION, REPORT OF THE FIFTY-SECOND CONFERENCE: HELSINKI (1966) [hereinafter *HELSINKI RULES*].

have been adopted by the courts adjudicating water conflicts, resulting in a set of rules of customary law.

1. The Notice Rule⁵⁰

This rule requires that an upper riparian state to an international watercourse notify the lower riparian of its intent to make a change in the water source. The rule applies inversely as well, requiring the lower riparian to notify the upper riparian of actions that will have an effect on the water source. If notification has been given and there is no change in the quality and quantity of water, it is sufficient that notification be made prior to unilateral action.

2. The Consultation Rule⁵¹

If the riparian user intends to make a change in the quality or quantity of an international water body, the Notice Rule is not sufficient. No party is entitled to cause significant changes in a water source that is also used by another party without consulting with that other party and receiving its opinion regarding use.

3. The Prevention of Human and Environmental Disaster Rule⁵²

This rule requires that any country must take steps to prevent human or environmental disaster in its use of a water source. This rule has been adopted as a customary rule, appears in the proposed conventions, and is included in the convention for biodiversity.⁵³ No country, according to this rule, can make any change that can cause harm to biodiversity in a water body or which can cause human or environmental disaster.

49. An update to the Helsinki Rules, adopted at the 2004 Berlin conference of the International Law Association [hereinafter Berlin Rules].

50. Berlin Rules art. 57; HELSINKI RULE art. 29(2); *NUIW* art. 12, 18. This rule is also reflected in a United Nations General Assembly Resolution endorsement of "a system of information and prior consultation." G.A. Res. 3129 U.N. GAOR, 28th Sess., 2199th plen. mtg. at 48 (1973), available at <http://daccessdds.un.org/doc/RESOLUTION/GEN/NR0/282/01/IMG/NR028201.pdf?OpenElement> (last visited Jan. 31, 2005).

51. *NUIW* art. 9, 11, 12; Berlin Rules art. 58; Gabčíkovo-Nagymaros Project (Hung. v. Slov.), 1997 I.C.J. 7 (Sept. 25).

52. See Berlin Rules including art.'s 7, 8, 12 and 16; *NUIW* art. 7, 20-23; Gabčíkovo-Nagymaros Project (Hung. v. Slov.), 1997 I.C.J. 140.

53. United Nations Conference on Environment and Development: Convention on Biological Diversity, June 5, 1992, art. 22, 31 I.L.M. 818, U.N. Doc. DPI/1307, (1992) [hereinafter CBD].

4. The Equitable Utilization in a Shared Drainage Basin Rule

This rule allows all parties having shared water resources to make use of the resource as limited by the other state's legitimate rights.⁵⁴

The first codified use of the principle of equitable utilization appears in the Helsinki Rules.⁵⁵ In 1986, the Seoul Rules⁵⁶ concerning international groundwater resources supplemented the Helsinki Rules to form the basis of modern negotiations on non-navigational uses of international waterways. The Helsinki Rules define an international drainage basin as "a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus."⁵⁷ Article IV of the Helsinki Rules, "Equitable Utilization of the Waters of an International Drainage Basin," clearly states the idea of equitable utilization: "Each basin state is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of waters of an international drainage basin."⁵⁸ The Berlin Rules emphasize not only the *right* to share in the benefits of a transboundary

54. Kerstin Mechlem, *Water as a Vehicle for Inter-State Cooperation: A Legal Perspective*, United Nations Food and Agriculture Organization (FAO) Development Law Service, Aug. 2003, at 9, at <http://www.fao.org/Legal/prs-ol/lpo32.pdf>. (last visited Jan. 31, 2005).

55. HELSINKI RULES, *supra* note 48, art. II.

56. The Seoul Rules on International Groundwaters, adopted by the International Law Association at the Sixty-Second Conference held at Seoul in 1986.

57. HELSINKI RULES, *supra* note 48, (providing definitions, as communicated by Professor Joseph W. Dellapenna, rapporteur of the Water Resources Committee, International Law Association.).

58. *Id.* Ch. 2, art. IV; this chapter also provides:

(a) the geography of the basin, including in particular the extent of the drainage area in the territory of each basin State; (b) the hydrology of the basin, including in particular the contribution of water by each basin State; (c) the climate affecting the basin; (d) the past utilization of the waters of the basin, including in particular existing utilization; (e) the economic and social needs of each basin State; (f) the population dependent on the waters of the basin in each basin State; (g) the comparative costs of alternative means of satisfying the economic and social needs of each basin State; (h) the availability of other resources; (i) the avoidance of unnecessary waste in the utilization of waters of the basin; (j) the practicability of compensation to one or more of the co-basin States as a means of adjusting conflicts among uses; and (k) the degree to which the needs of a basin State may be satisfied, without causing substantial injury to a co-basin State; . . . (3) The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable share, all

water source, but also the obligation to act in an equitable and reasonable manner.⁵⁹

Rules of governance of international water appear in the Bellagio Draft Treaty of 1989.⁶⁰ It calls for the establishment of transboundary commissions with the power to establish conservation areas and to adopt comprehensive management plans using the equitable apportionment factors developed in the Helsinki and subsequent rules. The treaty promoted the idea that transboundary groundwaters could be shared through agreement or the application of the equitable utilization doctrine.⁶¹ Can this principle be incorporated into the domestic legal structures of parties sharing the Dead Sea Basin?

C. Israeli Water Law

Israel chose the administrative disposition model for its domestic water rights system.⁶² The Water Law of 1959 (the "Water Law") holds that water is owned by the public, controlled by the state, and to be used for the purposes of the habitants of the state and the development of the country.⁶³ In order to enable maximum flexibility in the distribution of water uses, the Water Law created a Water Commissioner whose job is to manage the water uses of the country.⁶⁴ The power granted to the Water Commissioner enables him to decide who will receive water, at what qual-

relevant factors are to be considered together and a conclusion reached on the basis of the whole.

Id. ch. 2, art. v(2); See also NUIW, *supra* note 47, art. 5- "Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner"; "Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner".

59. Berlin Rules, art. 12, 13.

60. See Robert D. Hayton & Alber E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663 (Summer 1989). The treaty is based on the proposition that water rights should be determined by mutual agreement rather than be the subject of uncontrolled, unilateral taking, and that rational conservation and protection actions require joint resource management machinery.

61. See Albert E. Utton, *Sporhase, El Paso, and the Unilateral Allocation of Water Resources: Some Reflections on International and Interstate Groundwater Law*, 57 U. COLO. L. REV. 549 (1986).

62. Israel Water Law of 1959 § 1, available at http://www.environment.gov.il/Environment/Static/Binaries/Articals/Water_Law_1.pdf [hereinafter Israel Water Law]; see Richard Laster, *The Legal Framework for the Prevention and Control of Water Pollution in Israel* (1976) (unpublished Ph.D. dissertation, Hebrew University, Jerusalem) (on file with the Faculty of Law Library) [hereinafter Laster Dissertation].

63. Laster Dissertation, *supra* note 62.

64. Israel Water Law, *supra* note 62, Ch. 2, art. I, §§ 11, 138.

ity and at what quantity.⁶⁵ These decisions are made annually, enabling changes in allotments according to the amount of water available in any given year. The Water Law has defined water resources in the broadest possible manner, including “springs, streams, rivers, lakes, and other currents and accumulations of water, whether above ground or underground, whether natural, regulated or made, and whether water rises, flows or stands therein at all times or intermittently, and includes drainage water and sewage water.”⁶⁶

The Water Law is a most appropriate vehicle for management of water in a state with severely limited water resources. However, giving power over the water resources of a state to a single government employee has brought about some unexpected results. The Water Commissioner’s decisions bear the imprint of pressure groups, mainly farmers. In the context of the Dead Sea, one should ask how was a decision made to build the National Water Carrier of Israel, which diverts fresh water from the Sea of Galilee that previously flowed into the Dead Sea, thereby causing its degradation? What was the basis for the Water Commissioner’s decision to prefer water uses on the western side of the country to those on the eastern side? Since the Water Commissioner lacks public overview, one can find little historical background for his decisions.

Parallel to the unlimited power of the Water Commissioner, there is skeletal legislation for river basin management under two laws: the Drainage and Flood Control Law, and the Streams and Springs Authority Law,⁶⁷ in the drainage boards and river authorities. Under these laws, Israel has created eleven drainage boards covering the entire country, comprised of representatives of the local governments within the catchment basin. They have the authority to build, change, and maintain drainage systems within their boundaries in order to prevent runoff and health hazards

65. P.D. 8 (4) 196, Pardess Hannah et.al v. Minister of Agric., et al. This power has been somewhat tempered with the passage of the Freedom and Dignity Basic Law in 1992. International Constitutional Law, Israel – *Basic Law: Human Dignity and Liberty*, at http://www.oefre.unibe.ch/law/icl/is12000_.html; See (Jerusalem) District Court Case 3183/03, Mekorot Water Co. et al. v. Uri Shatil et al., Takdin-Mech. 2004(1)6201.

66. Israel Water Law, *supra* note 62, § 2. Taken to its logical legal conclusion, the Water Commissioner can control the water table in one’s toilet bowl.

67. The Drainage and Flood Control Law (1957); The Streams and Springs Authority Law, § 2 (1965), at http://www.environment.gov.il/Environment/bin/en.jsp?enPage=E_BlankPage&enDisplay=View&enDispWhat=Object&enDispWho=Articals^l2420&enZone=Wat_law.

from flooding.⁶⁸ Israel's two river authorities, the Yarkon and Kishon, have the power to regulate the flow of water, control pollution, and to protect the areas along the banks of streams and rivers and around springs.⁶⁹ Unlike the drainage boards, the river boards do not have jurisdiction over the entire catchment. On the other hand, the drainage boards have no power to improve amenity uses. To correct the situation, several drainage boards have requested the power of river boards, and to date two of the drainage boards have been given the powers and responsibilities of river authorities to combine the best aspects of both laws.⁷⁰

D. Palestinian Water Law

Palestinian legislation is complicated, and its water laws are no exception. During the last one hundred years, the West Bank has successively been under the jurisdiction of Turkey, Britain, Jordan, and Israel, each of whom passed its own laws on top of the laws that were already in force.⁷¹ There are remnants of Turkish law, the *Magelle*, which did not allow private ownership of flowing water, while in certain instances it allowed for limited private ownership of wells and springs located entirely on private property.⁷² Subsequent Jordanian law required the registration of water rights,⁷³ and ownership of water resources was related to the ownership of land.⁷⁴ Israeli law declared all water resources in the region as state property, and required the licensing of any water production facility.⁷⁵

The Water Law of 2002 of the Palestine National Authority, like its Israeli counterpart, declares all water resources to be pub-

68. The Drainage and Flood Control Law (1957) (in Hebrew).

69. Streams and Springs Authority Law, § 3 at http://www.environment.gov.il/Environment/bin/en.jsp?enPage=E_BlankPage&enDisplay=View&enDispWhat=Object&enDispWho=Articals^12420&enZone=Wat_law. There are currently two river authorities for the Kishon River and the Yarkon River.).

70. *Id.* § 2; Streams and Springs Authorities Order, 2003 (Granting the Responsibilities of River Boards to Drainage Authorities).

71. This article does not discuss the laws that apply in Gaza. Although Palestinian Law applies to Gaza as well, other laws (e.g. Jordanian Law) do not.

72. The *Magelle*, §§ 1235, 1237, 1238, at <http://www.majalla.org>. "Water flowing in the bowels of the earth are not the property of any man." *Id.* § 1235. "Oceans and large lakes are ownerless." *Id.* § 1237. "The many rivers that are no man's property and are not separated into rivulets, i.e. they don't enter into channels that are the property of a recognized group of people, are ownerless . . ." *Id.* § 1238.

73. Jordanian Land and Water Settlement Law No.40/1952.

74. AARON T. WOLF, *HYDRO POLITICS ALONG THE JORDAN: SCARCE WATER AND ITS IMPACT ON THE ARAB-ISRAELI CONFLICT* 61 (1995).

75. Israeli Military Order Amending Law No.31/1953. (Proclamation No.2/1967).

lic property and grants every person the right to water.⁷⁶ Power is given to the Palestine Water Authority to suggest water allocations and determine the priorities of usage.⁷⁷ But prior allocations, for example, private rights to certain springs and wells, are still respected.⁷⁸ While Palestinian law takes precedence over preceding law, it is taking time to enforce, and does not apply in areas under Israeli civilian control (Area C).

E. Jordanian Water Law

In 1988, Jordanian Law declared that all water resources available within the boundaries of the Kingdom are considered state owned property and shall not be used or transferred except in compliance with this law.⁷⁹

The Ministry of Water and Irrigation is responsible for water and public sewage in the Kingdom, formulation and transmission of the water policy, and assumes full responsibility for the economic and social development of the Jordan Valley.⁸⁰ These rights are subject to the rights given to the Jordan Valley Authority.

The two most important entities dealing with water in Jordan alongside the Ministry of Water are the Water Authority and the Jordan Valley Authority. The Water Authority of Jordan implements water policy, regulates the uses of water, and develops new water sources. It is also responsible for pollution control and water quality protection.⁸¹

The Jordan Valley Authority ("JVA") oversees the Jordan River Valley, which runs the entire length of the country, including the Dead Sea Basin.⁸² It is responsible for the development of

76. Palestine Water Law No.3/2002, art. 3.

77. *Id.* art. 7(3).

78. Julie Trottier, Case Study - The West Bank, Notes for the Panel Presentation, Allocating and Managing Water for a Sustainable Future: Lessons From Around the World, at the Natural Resources Law Center University of Colorado School of Law (June 11-14, 2002) (transcript on file with author).

79. *Law No. 18 of 1988: The Water Authority Law & Amendments Thereof*, art. 25(a), *see generally* <http://www.mwi.go.jo> (last visited Nov. 2, 2004).

All water resources available within the boundaries of the Kingdom, whether they are surface or ground waters, regional waters, rivers or internal seas are considered State owned property and shall not be used or transferred except in compliance with this Law. *Id.*

80. Administrative Organization Regulation for the Ministry of Water & Irrigation No.(54) for the year 1992, art. 4.

81. Water Authority Law of 1988, art. 6.

82. Jordan Valley Development Law As Amended by Law No. (30) (2001), art. 3.

area water resources, water delivery, drainage and flood protection, and irrigation projects. It acts as a tribunal in water disputes. The JVA is also responsible for tourism projects and environmental protection. The JVA is authorized to implement Valley development plans in accordance with the law.⁸³ Due to Jordan's dire lack of water, development of potential water sources is a top priority,⁸⁴ while the resulting effect on nature is given secondary consideration.

V. INTEGRATED WATER RESOURCES MANAGEMENT MODEL FOR INTERNATIONAL WATER BODY MANAGEMENT

A. Evolution of IWRM as a Set of Legal Principles

Integrated Water Resources Management ("IWRM") has become a very popular legal concept, a system that combines information-sharing, basin-wide management, effective enforcement, and transparency. It is inherently "holistic in [its] approach"; as it "identif[ies] an ever-widening range of stakeholder inputs that are to be considered in order to arrive at good watercourse management."⁸⁵ The concept of water resources management ("WRM") was discussed on a global scale at the 1977 United Nations Water Conference in Mar del Plata, Argentina, in which a resolution called for the development of ". . . assessment[s] . . . of water resources in all countries of the world"⁸⁶ In 1990, the U.N. New Dehli Meeting recognized that "IWRM is necessary to combat increasing water scarcity and pollution . . . [a]n appropriate mix of legislation, pricing policies and enforcement measures . . . essential to optimise [sic] water conservation and protection."⁸⁷ These U.N. conferences paved the way for subsequent meetings that would influence international water law as we know it today, most notably the Dublin Principles and Agenda 21.

83. *Id.* art. 5.

84. Jordanian Ministry of Water and Irrigation, *The Plan for the Response to Water Challenges*, see generally <http://www.mwi.gov.jo> (last visited Oct. 29, 2004).

85. Melvin Woodhouse, *Is Public Participation a Rule of Law of International Watercourses?*, 43 Nat. Resources J. 137, 143 (2003); IRC, *Integrated Water Resource Management in Water and Sanitation Projects* (2002), available at <http://www.irc.nl/pdf.php3?file=Pub/op31e.pdf> (last visited Oct. 12, 2003).

86. *Report of the United Nations Water Conference*, Mar del Plata, U.N. Doc. E/CN.70/29, at 66 (1977).

87. UNDP Sustainable Water Management, "Strategy Framework Document: Chapter Four", at <http://www.undp.org/seed/water/strategy/4.htm> (last visited Oct. 12, 2003).

In 1992 the International Conference on Water and the Environment ("ICWE") released the "Dublin Statement" highlighting four water management principles.⁸⁸ The contents of the Dublin Statement quickly became known as the Dublin Principles, which have been accepted and modified by subsequent international conventions. For example, later in the same year in Rio, the United Nations Conference on Environment and Development ("UNCED"), known as the Earth Summit, adopted Agenda 21.⁸⁹ Chapter 18 of Agenda 21 expanded upon the Dublin Principles: "[e]ffectively integrated management of water resources is important to all socioeconomic sectors relying on water."⁹⁰

Overall, Agenda 21 instilled in U.N. members the responsibility to take measures to implement sustainable development. IWRM was a conceptual system designed by the international community to implement sustainable water management approved in New Delhi and Rio. The Johannesburg Summit's Plan of Implementation includes the development of IWRM and water

88. The four principles are summarized as follows: 1) management demands linking social and economic development with protection of natural ecosystems . . . ; 2) decisions should be taken at lowest appropriate level, with full public consultation and involvement of users . . . ; 3) positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes . . . in ways defined by them . . . ; and 4) the basic right of all human beings to have access to clean water and sanitation at an affordable price . . . managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation. International Conference on Water and the Environment (ICWE) 1992, Development Issues for the 21st Century, Dublin Statement and Report of the Conference, Dublin, Ireland, (Jan. 26-31, 1992) (transcript on file with author).

89. U.N. Conference on Environment and Development, Agenda 21, U.N. Doc. A/CONF.151/26 (1992) [hereinafter Agenda 21].

90. *Id.*

Rational allocation prevents conflict and enhances the social development of local communities, as well as economic planning and productivity. Efficient demand management allows water-using sectors to make long-term savings on water costs and stimulates resource-conscious production technologies. Health conditions and environmental quality should also improve, either as a result of integrated development planning or as a beneficial consequence of improved environmental or social conditions.

Id. Draft, Agenda 21 A/CONF.151/L.3/Add.18, replaced by U.N. Conference on Environment and Development, Agenda 21, U.N. Doc. A/CONF.151/26 (1992) on 6/10/1992. See also Madeira Declaration on the Sustainable Management of Water, adopted by the European Council on Environmental Law, Apr. 17, 1999. (stating in Article 1, paragraph 3 that "[t]here is a need for a system of integrated management of surfacewater, groundwater and associated water which respects the environment as a whole, takes account of physical planning and is socially equitable and economically rational.")

efficiency plans by the year 2005.⁹¹ What's interesting to note is that the Convention on the Law of the Non-Navigational Uses of International Watercourses ("NUIW"), mentioned above as a foundation for the principle of equitable utilization, fails to mention IWRM in its report.⁹² It does, however, draw a link between water management and sustainable development, as it calls on watercourse states to consult one another concerning management, which is defined as sustainable development and optimal utilization, of the watercourse.⁹³ Since water management can vary fundamentally among neighboring states, the need for a working definition of IWRM becomes a necessary exercise in order to offer states the option to apply IWRM to a watercourse.

B. Working Definition

Attempts have been made to define IWRM in order to spur application of its holistic objectives. The Global Water Partnership's definition focuses on coordinated and sustainable development and management, which is in line with the NUIW.⁹⁴ One scholar suggests an interaction between human and natural systems in order to optimize the use and availability of water.⁹⁵ Ultimately, these guiding principles must be expressed in a legislative

91. Johannesburg Points of Implementation, ch. IV, par. 26.

92. See NUIW, *supra* note 47.

93. *Id.* Article 24 of NUIW defines management as follows:

1. Watercourse States shall, at the request of any of them, enter into consultation 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.

Id. art. 24.

94. Global Water Partnership: Austria Water Partnership, at http://www.gwpaustralia.org/about/1053677505_32055.html (last visited June 6, 2005) (defining Integrated Water Resources Management (IWRM) as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resulting economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.")

95. Mark R. Mujwahu, *Integrated Water Resources Management, the Necessary Framework for Sustainable Sector Reform*, at http://www.wsp.org/english/afr/wup_conf/v2_integrated.pdf (last visited Oct. 25, 2004) (stating that "[i]t is important to consider the interaction with the human systems because it is through these systems that water resource use is determined with the consequent impacts on quality and sometimes quantity. It is equally important to examine the interaction with natural systems because it is the natural systems, through the hydrological cycle that determine resource availability and quality.")

context. The following is a compilation of requirements for the management of a body of surface water, derived from literature on the subject and the authors' combined experience.⁹⁶

1. Knowledge of What Goes In and Out of a Drainage Basin

In order to manage a river, stream, or lake, any legal body created for management or governance must take into account the hydrological scheme that creates the physical presence of the water body. The drainage basin would necessarily serve as the political boundary of the water body because it is a natural boundary. Every drop of water falling within the basin would be governed. Therefore, it is extremely important for the governing body to know what flows in and what flows out of the water body and what is prevented from flowing in due to human intervention.

The Dead Sea is a naturally occurring international lake with water inflowing from the Lower Jordan River and from streams and wadis from within Israel and the Palestinian Authority as well as from Jordan. Therefore, it is imperative that a Dead Sea governing body have updated information regarding what flows into the lake. Even though the Dead Sea is a terminal lake where nothing flows out, the water management body must understand the concept of evaporation, which for the Dead Sea serves as flowing out. It will just be flowing up instead. This is also important for the Dead Sea due to its unique microclimate.⁹⁷

2. Understanding of the Quality and Quantity of Water

In addition to hydrology and limnology, the governing body must understand the composition of the water in the lake. For the Dead Sea this means that all streams and wadis must be monitored, as well as all sewage flows, surface-water, groundwater, and run-off water. In addition, quality of water in the lake must be monitored in order to determine the composition of the water.

96. See Ian C. Sinclair, *Institutional and Legal Aspects of Water Management*, International Seminar on Institutional and Legal Aspects of Water Management, Madrid (May 29-31 1985); Eyal Benvenisti, *SHARING TRANS-BOUNDARY RESOURCES: INTERNATIONAL LAW IN OPTIMAL RESOURCE USE* 143 (2002).

97. The Dead Sea has its own micro-climate, due to the combination of its elevation, the concentration of minerals in the air, evaporation, and the intense dry heat.

3. Public Participation, Transparency, and Accountability

Public participation can occur in several ways in a governing body, but the most effective way is for the members of the governing body to be representatives of the people, in other words, elected officials. Decisions made by an elected body are more accepted by the people than the decisions of a body not elected.⁹⁸ Therefore, it is clear that the governing body must be composed of representatives of the public, either directly elected to the water governing body by the people themselves or indirectly as representatives chosen by their electorate of local authorities sitting in the basin. The more effective method is not to elect officials directly to a governing body, but to have representatives of local councils sitting on the governing body together with other riparian users of the water, as well as representatives of the public who understand limnology, hydrology, ecology, and other aspects of water's unique qualities.⁹⁹

Since the governing body will be involved in the management of a body of water that affects people, it must be accountable for its actions. Additionally, with a budget of public funds under its control, accountability must be governed by principles of transparency and due diligence. Everything done by a governing body must be open to the public – its books, its meetings, its discussions, and its background papers. There should be nothing unavailable to public access, for not only is the water board made up of their representatives, its decisions affect their daily lives.¹⁰⁰

98. Bruce Ackerman & James Sawyer, *The Uncertain Search for Environmental Policy: Scientific Factfinding and Rational Decision-making Along the Delaware River*, 120 U. PA. L. REV. 419, 424 (1972).

99. This comes from the principal author's experience of 20 years representing drainage and river authorities.

100. U.N. Conference on Environment and Development: Rio Declaration on Environment and Development, U.N. Doc. A/CONF.151/5/Rev., 31 I.L.M. 874 (1992) Principle 10 states:

"Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided."

4. A Budgetary Base for Activities of the Drainage Board

No governing authority of a lake or stream can possibly operate without a budget. The best form of budgetary arrangement for a governing body is revenue derived from services rendered, and not one based only on government outlays. The reason for this is that a service-oriented body is better equipped to help the public and better equipped to understand the public. Additionally, it gives the body longevity. As long as the public is served, the public will also pay. Finally, it is wise to detach the water governing body from the coffers of the central government. Central governments are fickle when it comes to budgetary outlays and often reduce budgets without regard to needs.¹⁰¹

The best method for obtaining funds is for the governing body to be responsible for the supply of water, sewage control, and amenity usage along the banks or shores of the water body. The model used in England prior to privatization could serve as the optimal model for budgetary management, both regarding what went in and also what went out.¹⁰² The English water board was a closed enterprise, charging money for sewage treatment and water supply and using that money for ecological amenities, making the board not just a regulatory body, but a self-sufficient service provider as well.

5. Third Party Review of a Governing Body's Decisions

It is quite difficult for governing bodies to understand that they can make mistakes, but they do, and their actions must be reviewed by a national management body, a court of law, or both. In the case of an international lake, it is wise that the review be carried out by an international body such as the International Court of Justice, or a body created under international water law. This would give the public on all sides of the lake the feeling that there would be a final arbiter for decisions questionably rendered.

101. This comes from the principal author's experience of 20 years representing drainage and river authorities.

102. See Sinclair, *supra* note 96.

VI. APPLICATION OF INTERNATIONAL WATER LAW TO GOVERNANCE OF THE DEAD SEA

The best way to encourage consultation and mutual approval would be the creation of a commission for management of the Dead Sea Basin. A commission could be created with Israel, the Palestinian Authority, and Jordan to manage the Dead Sea in order to prevent further environmental degradation and to promote productive sustainable development. Therefore, relevant stakeholders must be identified by the three governments, and empowered by them, in order to spearhead a turnaround of the Dead Sea's fate. These 'players' must collectively take steps towards IWRM in order to, at the very least, salvage what is left of the Dead Sea and the Jordan River Basin as a whole. A brief look into proposed projects that could jumpstart the development of a Dead Sea Basin Commission, like the Kidron River/ Wadi Nar Master Plan and the Dead Sea Canal, to be discussed below, should be approached with this blend of holistic management and institutional capacity.

A. Proposal for Creating a Dead Sea Drainage Authority

As previously described, Israel has signed agreements with both the Jordanians and the Palestinians to promote and encourage future development in a cooperative manner. This has led to the creation of the Joint Water Committee between Israel and the Palestinian Authority, cooperation between Israel and Jordan on issues including water and the environment, and the multilateral talks on the protection of the environment. All of these can serve as a basis for future cooperation.

Ideally, the three states should each create drainage boards or hydrological basin boards in the Dead Sea area within their territory. Once created and in operative effect, the governments could then strengthen the drainage boards, with environmental powers as river boards or basin authorities. They could then create an overall Dead Sea Authority that would be an integrated water or environmental resources management commission. This would serve as a forum for future discussion, consideration, deliberation, arbitration, and decision making in the region.

Israeli water law has created drainage authorities as described above, covering the entire country. The law must be refined, however, in order to give the Israeli drainage authorities in the Dead Sea region the full power discussed in the six axioms

described in the previous section. As it now stands, the law gives drainage authorities power over land and drainage uses, but very little power over amenities. The board does have some power to determine the quantity of inflow into the Dead Sea. It also serves as the representative body of persons in the region. It is both transparent and accountable for its actions. It lacks however, power of environmental management and a full bouquet of environmental control.

Even though lacking a full panoply of powers, the Dead Sea Drainage Board has taken the initiative in basin management, as can be seen from its plan for the Kidron River/Wadi Nar Basin, described below.

B. Steps Toward a Dead Sea Basin Commission?

1. Kidron River/Wadi Nar Plan

It is clear that the conflict in the Middle East has thus far prevented the overall management of water bodies shared by neighbors in the region. Yet if the past is any indication of the future, there is no question that even during a time of conflict, drainage and river boards can serve as models of cooperation. As mentioned in an article by Professor Eyal Benvenisti,¹⁰³ there are several models of international cooperation in areas of conflict, and the most recent is actually occurring in the Dead Sea. The Dead Sea Drainage Board has invited the Palestinian Water Authority to create a joint master plan for the Kidron River/Wadi Nar, one of the streams flowing from Jerusalem through the Palestinian Authority into the Dead Sea.

This model of cooperation was presented at the Stockholm International Water Conference in August 2003 by representatives of the Dead Sea Drainage Board and the Palestinian Water Authority.¹⁰⁴ It will hopefully serve as a model for future cooperation in other joint streams and even serve as a basis for cooperation in the Dead Sea itself. The joint model is based on the drainage authority concept; understanding the operations and ins and outs of

103. EYAL BENVENISTI, *THE LEGAL FRAMEWORK OF JOINT MANAGEMENT INSTITUTIONS FOR TRANSBOUNDARY WATER RESOURCES*, IN *MANAGEMENT OF SHARED GROUND-WATER RESOURCES* 407 (Eran Feitelson & Marwan Haddad eds., 2001).

104. The 13th Stockholm Water Symposium, Aug. 10-16, 2003, plenum of August 11 SHARED WATER PROBLEMS IN ISRAEL, JORDAN AND THE PALESTINIAN AUTHORITY AREAS—"The Kidron River—A Case for Cooperation", Dr. Ihab Barghouti, Palestinian Water Authority, Mr. Ron Swartz, Director, Dead Sea Drainage Authority, and Dr. Richard Laster, Environmental Lawyer.

the Kidron River/Wadi Nar, finding its points of pollution, points of interest, and points of attraction, creating a Master Plan to upgrade and reclaim the River, and finally, creating a model for total management. If this attempt proves successful, it will lead the way for other joint rivers and wadis to be managed in a similar fashion.

2. Dead Sea Canal

It is hoped that the hydrological model described above will serve as a model for cooperation and rehabilitation of the Dead Sea. However, today the Dead Sea must not only contend with environmental degradation, but also with proposed plans for a canal, known as the Peace Canal, which would be laid from the Red Sea to the Dead Sea.¹⁰⁵ The water would be used to raise the water level of the Dead Sea and as a source of drinking water (after desalination), which would be pumped up to Amman and other towns in Jordan and Israel.

Discussions between Jordan and Israel concerning the Canal have taken place only on the political level. Yet no one knows the eventual legal, social, economic, and ecological effects of such a large-scale enterprise. For example, there are questions about whether the type of water to be transferred from the Red Sea to the Dead Sea will have an effect on the composition of the Dead Sea and reduce its uniqueness, its health effects, and its attractiveness for tourism.¹⁰⁶ There may be detrimental effects to the Red Sea and its ecosystem, and since the canal will be built on a fault line, there may also be risks to the area's groundwater. In addition, a project of this size requires huge energy components with a concomittal result in air pollution.

The project requires study and deliberation by an international authority, of the type proposed in this article, in order to measure the environmental discounts to the Dead Sea and the region.

VII. CONCLUSION

The hydrological basin is an excellent vehicle for management of an international water body, and the drainage board concept is

105. See Report From the World Economic Forum, *supra* note 1, *Red Sea-Dead Sea Canal Feasibility Agreement*.

106. I. Gavrieli et al., *The Impact of the Proposed "Peace Conduit" on the Dead Sea*, 40, *Isr. Geol. Surv., Rep. GSI/23/02* (Sept. 2002) (in Hebrew), at <http://www.gsi.gov.il/Articles/Article.asp?ArticleID=35&CategoryID=10>.

also an excellent vehicle for a legal framework of management. Using hydrological borders instead of political ones avoids questions of where to draw lines, and using drainage boards as a basis for cooperation avoids questions of who will serve on international commissions. Finally, using hydrological and limnological experts as advisors to, and members of, the regional drainage boards, serves to reduce the political effect which often causes conflicts due to a desire by politicians to score political points, rather than protect one's international natural resources.

Each of the three states should encourage the passing of national laws that would create drainage authorities within their territory. These authorities would appoint representatives to a Dead Sea Basin Commission, responsible for the control, management, and governance of the Dead Sea Basin based on the principles of IWRM.

Only when a Dead Sea Commission is established, composed of representatives of each country's Dead Sea drainage boards, can a holistic decision be made as to the effectiveness, importance and ecological necessity of any development in the Dead Sea Basin. If there is ever a need for decision-making at the highest level, this is the time for it, and two hands are better than one.