Water Balances in the Eastern Mediterranean

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Chapter 8

TRENDS IN TRANSBOUNDARY WATER RESOURCES: LESSONS FOR COOPERATIVE PROJECTS IN THE MIDDLE EAST

Aaron T. Wolf

Introduction

The 261 international rivers, covering almost one-half of the total land surface of the globe, provide ample opportunity for political tensions. Such has been the case in Africa, the Middle East, and Southeast Asia. Given water's preeminence as a critical resource and the fact that management of water resources is very poorly defined in the international arena, it is of little surprise that water and war are two topics assessed together with increasing frequency.

The history of hydropolitics along the rivers of the Middle East exemplifies both the worst and the best of international relations over water. All of the countries and territories riparian to the Jordan River — Israel, Jordan, the Palestine Authority, and Syria — are currently using between 95% and more than 100% of their annual renewable freshwater supply. In recent dry years, water consumption has routinely exceeded annual supply, and the difference has usually been made up through overdrafts on fragile groundwater systems. By 2020, water shortages will be the norm. Projected water requirements for 2020 are 2 000 Mm^3/year, or about 130% of current renewable supplies, for Israelis; 1 000 Mm^3, or 120% of current supplies, for Jordanians; and 310 Mm^3, or 150% of current supplies, for Palestinians on the West Bank and Gaza. The resolution of this crisis is extremely difficult because intense and fluctuating geopolitical forces have crafted political

boundaries in direct contradiction to the natural boundaries of the watersheds in the region.

Although shared water resources have led to, and occasionally crossed, the brink of armed conflict, they have also been a catalyst for cooperation between otherwise hostile neighbours, albeit rarely and secretively. For example, despite a growing literature suggesting that Arab–Israeli warfare has had a "hydrostrategic" component, the evidence suggests that water resources were not at all factors in strategic planning during the hostilities of 1948, 1967, 1978, or 1982. The decision to go to war and strategic decisions made during the fighting, including the question of which territory it was necessary to capture, were not influenced by water scarcity or the location of water resources. Moreover, although questions of water allocation and rights have been among the most difficult components in the Arab–Israeli peace talks and a large number of studies have identified hydrostrategic territory and advised its retention, no territory to date has been retained simply because of the location of water. Solutions, in each case, have focused on creative joint management of the resource, rather than sovereignty.

Water and conflict[1]

A growing literature describes water both as an historic and, by extrapolation, a future cause of interstate warfare. Westing (1986) suggested that "competition for limited ... fresh water ... leads to severe political tensions and even to war." Gleick (1993) described water resources as military and political goals, using the Jordan and Nile as examples. Remans (1995) used case studies from the Middle East, South America, and South Asia as "well-known examples" of water as a cause of armed conflict. Samson and Charrier (1997) wrote that "a number of conflicts linked to fresh water are already apparent" and suggested that "growing conflict looms ahead." Butts (1997) suggested that "history is replete with examples of violent conflict over water" and named four Middle Eastern water sources particularly at risk. Finally, Homer-Dixon (1994), citing the Jordan and other water disputes, came to the conclusion that "the renewable resource most likely to stimulate interstate resource war is river water."

[1] The next two sections are drawn from Wolf, A.T. (1999b).

A close examination of the case studies cited in this literature reveals looseness in classification. Samson and Charrier (1997), for example, listed 18 cases of water disputes, only one of which was described as "armed conflict," and that particular case (on the Cenepa River) turned out not to be about water at all but about the location of a shared boundary, which happened to coincide with the watershed. No armed conflicts occurred in any of Remans' (1995) "well-known" cases (except the one between Israel and Syria, described below), nor in any of the other lists of water-related tensions presented.

The examples most widely cited are wars between Israel and its neighbours. Westing (1986) listed the Jordan River as a cause of the 1967 war and, in the same volume, Falkenmark (1986), mostly citing Cooley (1984), described water as a causal factor in both the 1967 war and the 1982 Israeli invasion of Lebanon. Myers (1993), using water in the Middle East as his first defining example of "ultimate security," wrote that "Israel started the 1967 war in part because the Arabs were planning to divert the waters of the Jordan River system." In fact, after Israel's 1982 invasion of Lebanon, a "hydraulic-imperative" theory was developed in academic literature and the popular press (see, for example, Davis et al. 1980; Stauffer 1982; Schmida 1983; Stork 1983; Cooley 1984; Dillman 1989; and Beaumont 1991). This theory describes the quest for water resources as the motivator for Israeli military conquests, both in Lebanon in 1979 and 1982 and earlier, on the Golan Heights and West Bank in 1967.

The main problem with these theories is a complete lack of evidence. Although shots were fired over water conflict between Israel and Syria in 1951–53 and 1964–66, the final exchange, including both tanks and aircraft on 14 July 1966, stopped Syrian construction of the diversion project in dispute, effectively ending water-related tensions between the two states. The 1967 war broke out almost a year later, and no link has ever been documented. The 1982 invasion provides even less evidence of any relation between hydrologic and military decision-making. In extensive papers investigating precisely such a linkage between hydro- and geostrategic considerations, both Libiszewski (1995) and Wolf (1995a) concluded that water was neither a cause nor a goal of any Arab–Israeli warfare.

To be fair, it should be noted that this analysis only describes the relationship between interstate armed conflict and water resources as a scarce resource. Internal disputes, such as those between interests or provinces, as well as those in

which water was a means, method, or victim of warfare, are excluded. Also excluded are disputes in which water is incidental to the dispute, such as those about fishing rights, access to ports, transportation, or river boundaries. Many of the authors — notably, Gleick (1993), Libiszewski (1995), and Remans (1995) — are very careful about these distinctions. The bulk of the articles cited above, then, turn out to be about political tensions or stability, rather than about warfare, or about water as a tool, target, or victim of armed conflict — all important issues, just not the same as "water wars."

To cut through the prevailing anecdotal approach to the history of water conflicts, the analysts working on the database project investigated those cases of international conflict in which armed exchange was threatened or took place over water resources per se. We used the most systematically collected information available on international conflict — the International Crisis Behavior data set, collected by Jonathan Wilkenfeld and Michael Brecher (1997). This data set contains information only on disputes the head researchers considered international crises. Their definition of an international crisis was any dispute in which (1) basic national values are threatened (for example, territory, influence, or existence); (2) time for making decisions is limited; and (3) the probability of military hostilities is high. Using these guidelines, they identified 412 crises for the period of 1918–94. Of these, only 7 were even partially related to water resources (Figure 1). Thus, the actual history of armed conflict over water is somewhat less dramatic than the water wars literature would lead one to believe: a total of 7 incidents. In 3 of these, no shots were fired. As near as we can find, there has never been a single war fought over water.[2]

This is not to say that there is no history of water-related violence — quite the opposite is true — only that these incidents are at the subnational level, generally between tribes, water-use sectors, or provinces. Nationally internal water conflicts are, in fact, quite prevalent. Interprovincial violence along the Cauvery River in India is but one example. California farmers blew up a water pipeline meant for Los Angeles. Much of the violent history in the Americas between indigenous peoples and European settlers has included struggles over water. The US desert

[2] This in not quite true. The earliest documented interstate conflict known is a dispute between the Sumerian city-states of Lagash, and Umma over the right to exploit boundary channels along the Tigris in 2500 BCE (Cooper 1983). In other words, the last and only water war was 4 500 years ago.

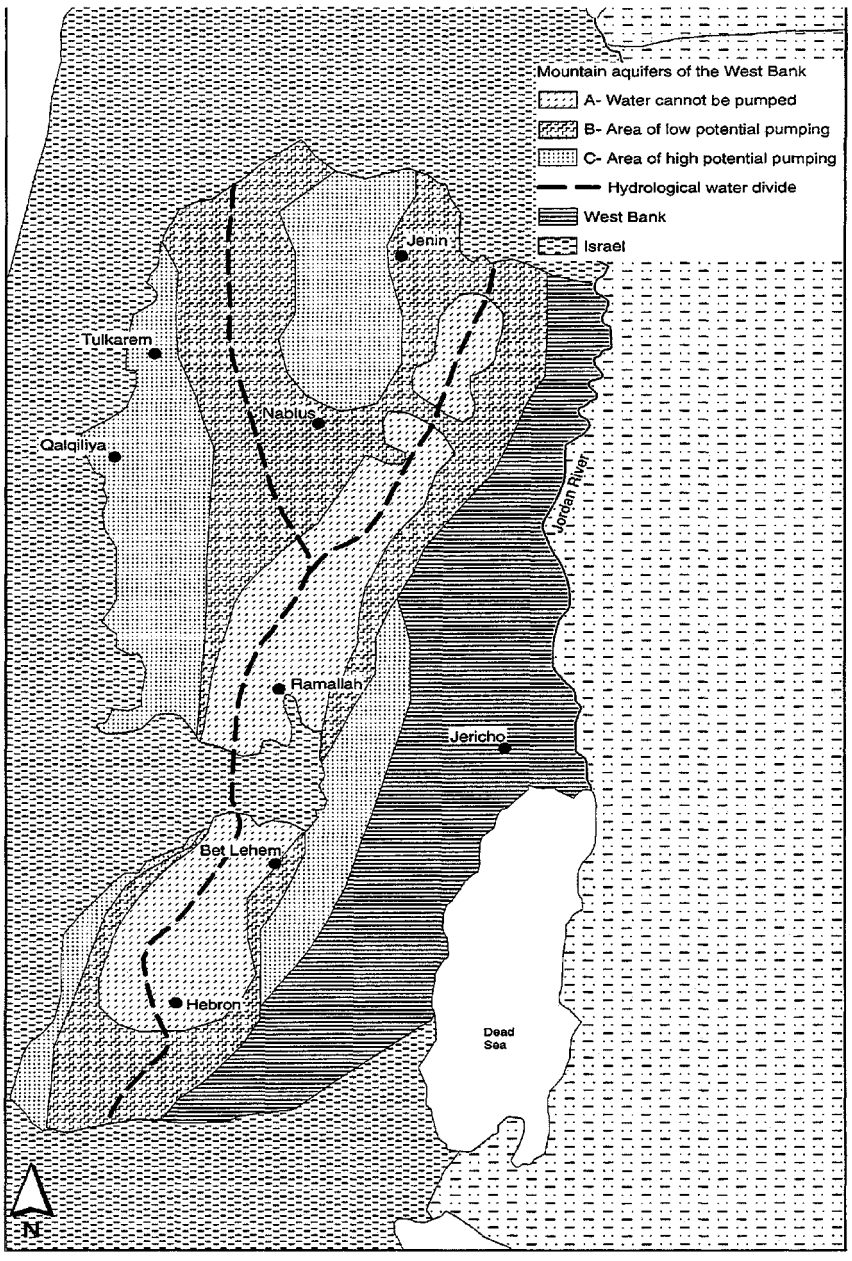

Figure 1. Mountain aquifers of the West Bank.

Cases of acute water-related disputes[3]

1948 — Partition between India and Pakistan leaves the Indus Basin divided in a particularly convoluted fashion. Disputes over irrigation water exacerbate tensions in the still-sensitive Kashmir region, bringing the two riparians "to the brink of war." Twelve years of World Bank-led negotiations lead to the 1960 Indus Waters Agreement.

February 1951 – September 1953 — Israel and Syria exchange sporadic fire over Israeli water development works in the Huleh Basin, which lies in the demilitarized zone between the two countries. Israel moves its water intake to the Sea of Galilee.

January–April 1958 — Amid pending negotiations over the Nile waters, Sudanese general elections, and an Egyptian vote on Sudan–Egypt unification, Egypt sends an unsuccessful military expedition into territory in dispute between the two countries. Tensions were eased (and a Nile Waters Treaty signed) when a pro-Egyptian government was elected in Sudan.

June 1963 – March 1964 — The 1948 boundaries left Somali nomads under Ethiopian rule. Border skirmishes between Somalia and Ethiopia took place over disputed territory in Ogaden desert, which includes some critical water resources (both sides were also aware of oil resources in the region). Several hundred were killed before cease-fire was negotiated.

March 1965 – July 1966 — Israel and Syria exchanged fire over "all-Arab" plan to divert the Jordan River headwaters, presumably to preempt the Israeli National Water Carrier, an out-of-basin diversion plan from the Sea of Galilee. Construction of the Syrian diversion was halted in July 1966.

April–August 1975 — In a particularly low-flow year along the Euphrates (owing to filling of upstream dams), Iraq claimed that the flow reaching its territory was "intolerable" and asked that the Arab League intervene in its dispute over this with Syria. The Syrians claimed that less than half the river's normal flow was reaching its borders that year, and after a barrage of mutually hostile statements, an Arab League technical committee that had been formed to mediate the conflict pulled out. In May 1975, Syria closed its airspace to Iraqi flights, and both Syria and Iraq reportedly transferred troops to their mutual border. Only mediation on the part of Saudi Arabia broke the increasing tension.

April 1989 – July 1991. Two Senegalese peasants were killed over grazing rights along the Senegal River, which forms the boundary between Mauritania and Senegal. This sparked smoldering ethnic and land-reform tensions in the region. Several hundred people were killed as civilians from border towns on either side of the river attacked each other, until each country used its army to restore order. Violence broke out sporadically until diplomatic relations were restored later in 1991.

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[3] I define an acute dispute as one involving the mobilization of armies or shots fired in an international setting.

state of Arizona even commissioned a navy (made up of one ferry boat) and sent its state militia to stop a dam and diversion project on the Colorado River in 1934 (Fredkin 1981).

One need look no further than relations between Bangladesh and India to note that internal instability can both be caused by and exacerbate international water disputes. At one time, India built a barrage at Farakka to divert a portion of the Ganges away from its course into Bangladesh toward Calcutta, 100 miles (1 mile = 1.609 km) to the south, for the purpose of flushing silt away from Calcutta's seaport. Adverse effects in Bangladesh, resulting from reduced upstream flow, included degradation of both surface and groundwater, change in morphology, impeded navigation, increased salinity, degraded fisheries, and danger to water supplies and public health. Environmental refugees from the affected areas further compounded the problem. Ironically, many of those displaced in Bangladesh found refuge in India (Biswas and Hashimoto 1996).

So, although no water wars have occurred, there is ample evidence that the lack of fresh water has lead to occasionally intense political instability and that on a small scale, acute violence can result. What we seem to be finding, in fact, is that geographic scale and intensity of conflict are inversely related.

Water and cooperation

The history of water dispute resolution, in contrast to that of conflict, is much more impressive. The Food and Agriculture Organization of the United Nations has identified more than 3 600 treaties relating to international water resources, dating between 805 and 1984, the majority of which deal with some aspect of navigation (FAO 1978, 1984). Since 1814 about 300 international treaties have been negotiated to deal with nonnavigational issues of water management: flood control, hydropower projects, and allocations for consumptive or nonconsumptive uses in international basins. Restricting ourselves to those signed in this century that deal with water per se and excluding those that deal with boundaries or fishing rights, we have collected the full texts of 149 treaties and have scanned or digitally entered them into our Transboundary Freshwater Dispute Database at Oregon State University, in conjunction with projects funded by the World Bank and the US Institute of Peace. Negotiating notes and published descriptions of many treaty negotiations are also being collected.

Some 14 case studies have been described in detail and in similar format for purposes of comparison in forthcoming research work. These cases include nine watersheds: the Danube, Euphrates, Jordan, Ganges, Indus, La Plata, Mekong, Nile, and Salween; two aquifer systems: US–Mexico shared systems and the West

Bank aquifers; two lake systems: the Aral Sea and the Great Lakes; and one engineering endeavour: the Lesotho Highlands Project. Jesse Hamner, now at Emory University, developed a systematic database compilation of these treaties, creating fields for the inclusion of basins, countries involved, dates signed, treaty topics, allocation measures, conflict resolution mechanisms, and nonwater linkages. Analyses from this database are described in greater detail in Wolf (1997) and in Hamner and Wolf (1998). Details of the fourteen case studies listed can be found in Bingham et al. (1994).

The historic reality has been quite different from what the water wars literature would have one believe. In modern history, only seven minor skirmishes have occurred over international waters — invariably, other interrelated issues also factor in. Conversely, more than 3 600 treaties have been signed, historically, over different aspects of international waters, almost 150 in this century dealing with water qua water, many showing tremendous elegance and creativity for dealing with this critical resource. This is not to say that armed conflict has not taken place over water, only that such disputes generally are between tribes, water-use sectors, or provinces. A close look at the very cases most commonly cited as water conflicts reveals ongoing dialogue, creative exchanges, and negotiations leading fairly regularly to new treaties. A new question emerges that is arguably more thought provoking and less dramatic than that of where the next water war will break out: Given all of the seemingly conflict-inducing characteristics of transboundary waterways, why has so little international violence taken place?

Water and the Arab–Israeli peace negotiations[4]

The history of hydropolitics along the rivers of the Middle East has roots older than the states themselves. Water-related conflict, for example, informed the borders of the British and French mandates, later the modern entities of Israel, Jordan, Lebanon, the Palestine Authority, and Syria. As each of these entities developed its water resources unilaterally, dispute became inevitable — every state or territory in the Jordan River watershed has at least some of its water sources in a different and occasionally hostile state or territory. Exchanges of fire actually broke out between Israel and Syria over water in the mid-1950s and 1960s. The problems were only exacerbated with the 1967 war.

The West Bank overlies three major aquifers, two of which Israel has been tapping into from its side of the Green Line since 1955. In the years of Israeli occupation, a growing West Bank and Gaza population, along with burgeoning

[4] This section draws from Wolf (1999a).

Jewish settlements, increased the burden on the limited groundwater supply, resulting in an exacerbation of already tense political relations. Palestinians have objected strenuously to Israeli control of water resources and development of settlements, which they see as being at their territorial and hydrologic expense, whereas Israeli authorities view hydrologic control in the West Bank as defensive. With about 30% of Israeli water originating on the West Bank, the Israelis perceive the need to limit groundwater exploitation in these territories to protect the resources themselves and their wells from saltwater intrusion.

Because of the disparate depths needed to reach water from these aquifers in the coastal plain and in the Judean hills (about 60 m in the plain, 150–200 m in the foothills, and 700–800 m in the hills [Goldschmidt and Jacobs 1958; Weinberger 1991]) and the resulting cost differences in drilling and pumping wells in these areas, portions of the aquifers are especially vulnerable to overpumping along a narrow western band of a northern lobe of the West Bank, in the region of Kalkilya and Tulkarm (see Figure 1).

In 1977, the right-wing Likud Party gained control of the Israeli parliament for the first time. As Israeli Prime Minister Menachem Begin was preparing for negotiations with Egyptian President Anwar Sadat, he asked the Water Commissioner at the time, Menachem Cantor, to provide him with a map of Israeli use of water originating on the West Bank and guidelines as to where Israel might relinquish control if protecting Israel's water resources was the only consideration.

Cantor concluded that a "red line" could be drawn, beyond which Israel should not relinquish control, a line running north to south and following roughly the 100- to 200-m contour line along both "lobes" of the West Bank. Israeli water planners still refer to this red line as a frame of reference, and it has occasionally been included in academic boundary studies of the region (Area C in Figure 1). This concept of a red line was later expanded by others to areas of the northern headwaters and the Golan Heights.

In 1991, the Jaffee Center for Strategic Studies at Tel Aviv University asked two researchers — Yehoshua Schwartz, Director of Tahal, Israel's water planning agency, and Aharon Zohar, also at Tahal at the time — to undertake a study of the regional hydrostrategic situation and the potential for regional cooperation. The result, a 300-page document titled *Water in the Middle East: Solutions to Water Problems in the Context of Arrangements between Israel and the Arabs,* was one of the most comprehensive studies of its kind (Schwartz and Zohar 1991). It examined a number of scenarios for regional water development, including possible arrangements between Israel and Egypt, Iraq, Jordan, Lebanon, the Palestinians on the West Bank and Gaza, Saudi Arabia, Syria, and Turkey. Scenarios

were included both for regional cooperation and for its absence. Evaluations were made of hydrologic, political, legal, and ideological constraints. The impacts of potential global climatic change were also considered. The study showed, in the words of Joseph Alpher, director of the Jaffee Center, "the potential beauty of multi-lateral negotiations" (Alpher 1994).

Some of the findings of the study contradicted government policies at the time. In the sections on possible arrangements between Israel and the Palestinians and between Israel and Syria, maps of the West Bank and Golan Heights included lines to which Israel might relinquish control of the water resources in each area without overly endangering its own water supply. The line in the West Bank, based on Cantor's red line, suggested that with legal and political guarantees, Israel might give Palestinian authorities control of the water resources in more than two-thirds of the West Bank. This would not threaten Israel's water sources from the Yarkon-Taninim (western mountain) aquifer, although the authors advocated relinquishing control beyond the red line.

The same was true of more than half of the Golan Heights. These maps contradicted the position of the Ministry of Agriculture. Headed by Rafael Eitan of the right-wing Tzomet party, the Ministry's position was that to protect Israel from threats to both the quantity and the quality of its water, it had to retain political control over the entire West Bank.[5]

On 12 December 1991, 70 copies of the report were sent throughout Israel for review, including to the Ministry of Agriculture. Calling the maps mentioned "an outline for retreat," Rafael Eitan and Dan Zaslavsky, whom Eitan had recently appointed Water Commissioner, insisted on a recall of the review copies and a delay in the release of the report. In January 1992, the Israeli military censor backed the position of the Ministry of Agriculture and, citing the sensitivity of the report's findings, censored the report in its entirety.[6]

Bilateral and multilateral negotiations

The Gulf War in 1990 and the collapse of the Soviet Union caused a realignment of political alliances in the Middle East that finally made possible the first public, face-to-face peace talks between Arabs and Israelis at a meeting held in Madrid on 30 October 1991. During bilateral negotiations between Israel and each of its

[5] Eitan's position, argued in full-page ads in the Israeli press, has little bearing in hydrogeology, as discussed in Wolf (1995a).

[6] When peace talks began in 1991, the document remained censored, for fear its release would reveal Israeli negotiating strategy. The document has not been released to date.

neighbours, it was agreed that a second track be established for multilateral negotiations on five subjects deemed "regional," including water resources. These two mutually reinforcing tracks — the bilateral and multilateral — led to a peace treaty between Israel and Jordan and a declaration of principles for agreement between Israel and the Palestinian Authority. Both have a water component in terms of allocations and projects. In neither, however, has water had any influence on the discussions over final boundaries.

Israel–Jordan Peace Treaty

Israel and Jordan have probably had the warmest relations of any two states legally at war with each other. Communication between the two states has taken place since the creation of each, ameliorating conflict and facilitating conflict resolution on a variety of subjects, including water. The so-called Picnic Table Talks on allocations of the Yarmuk have taken place since the 1950s, and negotiations to formulate principles for water-sharing projects and allocations have occurred in conjunction with, and parallel to, both bilateral and multilateral peace negotiations.[7] These principles were formalized on 26 October 1994, when Israel and Jordan signed a peace treaty, ending more than four decades of a legal, when not actual, state of war.[8]

For the first time since the states came into being, the treaty legally defines mutually recognized water allocations. Acknowledging that "water issues along their entire boundary must be dealt with in their totality," the treaty spells out allocations for both the Yarmuk and Jordan rivers and Arava–Araba groundwater and calls for joint efforts to prevent water pollution. Recognizing "that their water resources are not sufficient to meet their needs," the treaty calls for ways of alleviating water shortage through cooperative projects, both regional and international.

The peace treaty also makes some minor boundary modifications. The Israel–Jordan boundary was delineated by Great Britain in 1922, following the centre of the Yarmuk and Jordan rivers, the Dead Sea, and Wadi Araba. In the late 1960s and 1970s, Israel had occasionally made minor modifications to the boundary south of the Dead Sea to make specific sections more secure from infiltrators. On occasion, this was also done to reach sites from which small wells might better be developed. In the last 16 years, no modifications have been made,

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[7] For more details on the bilateral and multilateral talks on water, see Wolf (1995b).

[8] To my knowledge, these are the first international boundaries defined legally by Universal Transverse Mercator coordinates, as measured using the Global Positioning System.

except on the rare occasion when one of these local wells ran dry and had to be redug. All of these territorial modifications were reversed, and all affected land was returned to Jordan as a consequence of the peace treaty, although Israel still retains rights to use the water from these wells. Moreover, a small enclave of Jordanian territory in the Arava is being leased back to Israel in 25-year increments.

One other area was similarly affected. In 1926, a Jewish entrepreneur named Pinhas Rutenberg was granted a 70-year concession for hydropower generation at the confluence of the Yarmuk and Jordan rivers on land leased by Trans-Jordan. The dam that he built for this purpose would later be destroyed in the fighting of 1948, and the 1949 Armistice Line ended up leaving a small portion of Jordan under Israeli control. This land was farmed by the kibbutz Ashdot Ya'akov, established in 1933. With the 1994 peace treaty, sovereignty of the land was returned to Jordan, which in turn leased it back to Israel — Israeli kibbutznikim now travel into Jordanian territory regularly to farm their land.

In what will undoubtedly become a classic modification of the tenets of international law, Israelis and Jordanians, in their 1994 peace treaty, invented legal terminology to suit particularly local requirements. In negotiations leading up to the treaty, the Israelis, arguing that the entire region was running out of water, insisted on discussing only water "allocations," that is, the future needs of each riparian. Jordanians, in contrast, refused to discuss the future until past grievances had been addressed — they would not negotiate allocations until the historic question of water "rights" had been resolved.

There is little room to bargain between the past and the future, between rights and allocations. Negotiations had reached an impasse when one of the mediators suggested the term, "rightful allocations," to describe simultaneously historic claims and future goals for cooperative projects. This new term is now immortalized in the water-related clauses of the Israel–Jordan Peace Treaty.

Israeli–Palestinian Declaration of Principles and Interim Self-government Agreement

On 15 September 1993, Palestinians and Israelis signed the Declaration of Principles on Interim Self-Government Arrangement, which called for Palestinian autonomy in, and removal of Israeli military forces from, Gaza and Jericho. Among other issues, this bilateral agreement called for the creation of a Palestinian Water Administration Authority (later, the Palestinian Water Authority). Moreover, the

first item in Annex III, on cooperation in economic and development programs, included a focus on

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

At about the same time, Israeli water managers discovered an additional 70 Mm^3/year of available yield in the eastern mountain aquifer — the only one of the three main West Bank units not being overpumped at the time. This probably did not hurt Jericho's choice as the first West Bank town to be given autonomy.[9]

Between 1993 and 1995, Israeli and Palestinian representatives continued negotiating toward a broadening of the interim agreement to encompass more West Bank territory. On 28 September 1995, the Israeli–Palestinian Interim Agreement on the West Bank and the Gaza Strip, known as Oslo II, was signed in Washington, DC. The issue of water rights was one of the most difficult to negotiate, and a final agreement was postponed, leaving water rights to be included in the negotiations for Final Status arrangements.[10] Nevertheless, a tremendous compromise was achieved by the two sides: Israel recognized the Palestinian claim to water rights, and a Joint Water Committee (JWC) was established to cooperate in management of West Bank water and to develop new supplies. The JWC, in principle, supervises joint patrols to investigate illegal water withdrawals; its first action was to discover and put a stop to illegal drilling in the Jenin area in December 1995 (*Israel Line*, 20 Dec 1995).[11]

In accordance with the agreement, Israeli forces withdrew from six Palestinian cities in order from north to south and from 450 towns and villages throughout the West Bank. The final status of Israeli settlements in the West Bank has yet to be determined. No territory at all was identified as being necessary for

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[9] There is no evidence at all that the water was even considered in this choice; the comment is only this author's speculation.

[10] Oslo II estimates the future needs of West Bank Palestinians at 70–80 Mm^3/year. Until a final arrangement is negotiated, the two sides agree to cooperate to find a total 28.6 Mm^3/year for the interim period.

[11] E-mail summary of Israeli news, distributed by the Israeli Embassy in Washington, DC, USA. Unfortunately, the early promise of the JWC has not materialized. In the current political climate, in fact, it is all but inoperative.

Israeli annexation for access to water resources. The second and third cities scheduled for Israeli withdrawal — Tulkarm and Kalkilya — fell well within the red line delineated in Israeli studies as needed to retain for water security.

This lack of correlation between transferred territory and the location of water resources has become ever more apparent. Most recently, the November 1998 agreement reached at the Wye Plantation transferred an additional 13% of the West Bank from Israeli to joint territory (3% of it as a nature preserve), and 14.2% that had been joint territory was moved to Palestinian control. Figure 2[12] superimposes land transfers from both the Oslo II and the Wye negotiations onto a map delineating the most hydrologically sensitive territories of the West Bank. Even a cursory examination shows that hydrostrategic considerations are all but ignored in favour of joint management and other creative solutions.

Negotiations between Israel, Lebanon, and Syria

At the time of writing, water has not been raised in official negotiations between Israel and Syria.[13] Serious bilateral negotiations have only taken place since the fall of 1995, and given the influence Damascus has on Beirut, Israel–Lebanon talks are not likely until Israel and Syria make more progress. Israelis had hoped to begin talks on water resources with the Syrians at a meeting in Maryland in January 1996, but the Syrians reportedly refused to broaden the scope (*Israel Line*, 24 Jan 1996).

The basis for Israel–Syria negotiations is the premise of exchanging the Golan Heights for peace. Discussions so far have focused on interpretations of how much of the Golan, with what security arrangements, and for how much peace. The crux of the territorial dispute is the question of which boundaries Israel would withdraw — those between Israel and Syria have included the international boundary between the British and French mandates (1923), the Armistice Line (1949), and the cease-fire lines from 1967 and 1974 (Figure 3).

The Syrian position has been to insist on a return to the borders of 5 June 1967, whereas Israel refers to the boundaries of 1923. Although it has not been mentioned explicitly, the difference between these two positions is precisely over access to water resources. The only distinction between the two lines is the inclusion or exclusion of the three small areas constituting the demilitarized zone

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[12] Many thanks to Robert Tobys, a geography student at Oregon State University, for bringing his cartographic skills to bear on this intricate problem.

[13] In unofficial Track II discussions, water was the focus of meetings where Israelis and Lebanese were present as early as 1993 and where Israelis and Syrians participated in 1994. Participants at these meetings did not necessarily have any official standing.

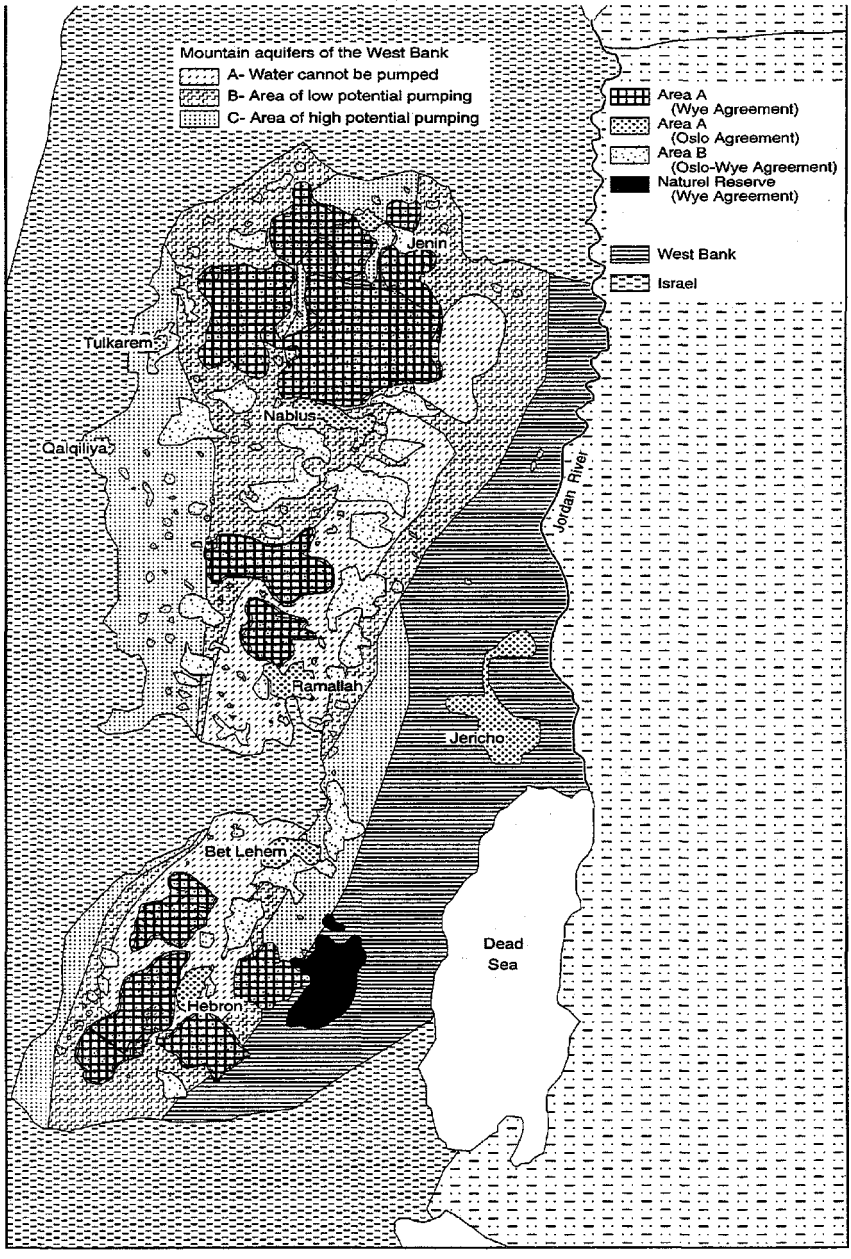

Figure 2. Mountain aquifers of the West Bank, with land transfers from Oslo II and the Wye agreements.

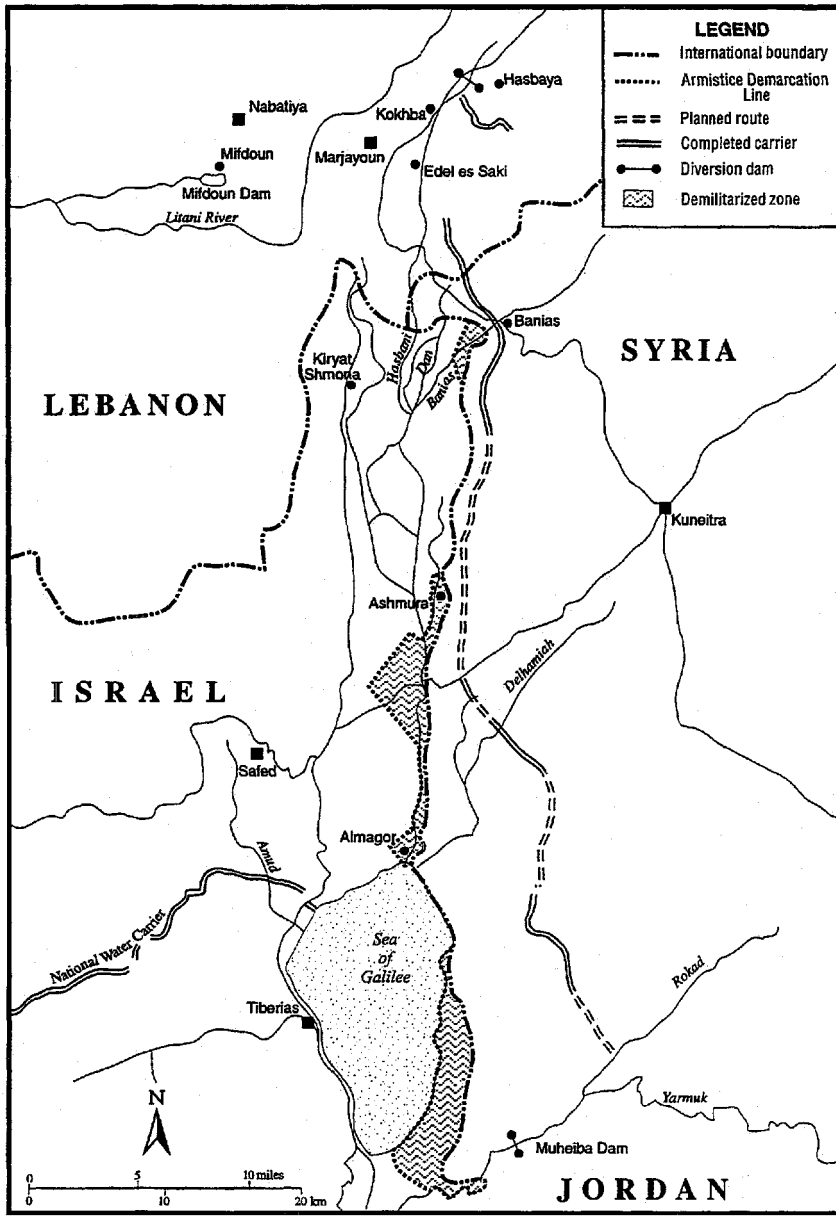

Figure 3. Boundaries between Israel, Jordan, Lebanon, and Syria.

between 1949 and 1967 — Givat Banias (the hill overlooking Banias springs), the Daughters of Jacob Bridge area, and the town of El-Hamma (Hamat Gader) — a total of about 60 km^2. These three territories were included in British Palestine specifically because of their access to the Jordan and Yarmuk rivers; moreover, as each is a relatively low-lying area with no strategic importance, their access to water is still considered their main value.[14]

Even before Israel–Syria negotiations began, a flurry of articles stressed the importance of water on the Golan Heights. As mentioned above, Schwartz and Zohar (1991) advised Israeli retention of the Golan Heights west of the Jordan River watershed line to guarantee continued control of the quantity and quality of water. In a 1994 study, Shalev (1994), himself a general retired from the Israeli army, cited five other retired generals on the importance of Israeli sovereignty over the Golan for the protection of water resources. Even in his small sample, Shalev finds a spectrum of opinion, from Major General Hofi, who suggested that Israel need retain a physical presence on the Golan Heights, to Major General Shafir, who advocated retaining at least the plateau above the Sea of Galilee, to former Chief-of-Staff Gur, who concluded that the water problem could be resolved politically in a peace treaty and that the territory was, therefore, not vital. Shalev concluded that Syria would not risk a war with Israel for water, especially as a diversion would take years to construct and would constitute a clear *causus belli*. It stands to reason, Shalev argued, that countries involved in water-sharing agreements would want to maintain them.

In the meantime, Schiff (1995), Tarnopolsky (1996), and others have argued in the popular Israeli and Jewish press that water's paramount importance may scuttle negotiations over the Golan, whereas Israeli politicians from the ruling Labour Party, including Prime Minister Shimon Peres and Foreign Minister Ehud Barak, argued that although the land may be negotiable, the water is not (*Jerusalem Post*, 6 and 27 Jan 1996).

Conclusion

Accounts of conflict related to water indicate that only seven minor skirmishes have occurred in this century and that no war has yet been fought over water. In contrast, 145 water-related treaties were signed in the same period. War over water seems not to be strategically rational, hydrographically effective, or economically feasible. Shared interests along a waterway seem to consistently outweigh

[14] One might argue that the hot springs at Hamat Gader offer economic benefits, but these are relatively minor.

water's conflict-inducing characteristics. Furthermore, once cooperative water regimes are established through treaties, they turn out to be impressively resilient over time, even between otherwise hostile riparians and even as conflict is waged over other issues. These patterns suggest that the most valuable lesson to be learned from the history of international water disputes is that this is a resource whose characteristics tend to induce cooperation, inciting violence only as the exception.

The Jordan River basin provides a representative example in microcosm. Evidence seems to suggest that not much of the quest for negotiated boundaries has been influenced by the location of water resources. This is not to say that water has not been an important topic in each set of negotiations — quite the opposite is true. Questions about water allocations and rights have been intricate and difficult to resolve. Nevertheless, the negotiations between Israel and Jordan have been concluded, the talks between Israel and the Palestinians are ongoing, and despite the many studies identifying hydrostrategic territory and advising its retention, the location of water has not been a factor in any retention of territory. Solutions have all emphasized creative joint management.

The pattern that does seem to be emerging, however, is that, without other concerns, water does not justify retention of territory. For example, in the absence of any legal claims, security interests, or settlements, Israel withdrew from all the Jordanian territory it had occupied, even those small portions that had hydrostrategic importance. What was important was an agreement on water management, not territory.

These principles may be played out in negotiations between Israel and Syria as well. Whereas Syria insists on the Armistice Line as it stood on 5 June 1967, Israel is arguing for boundaries based on the 1923 international division between the British and French mandates, the difference being three small areas of vital hydrostrategic importance. Based on the patterns of negotiations between other coriparians in the region, once the right people are in the room and they attain a clear mandate to reach an agreement, the territorial imperative will be circumvented in favour of the principles of joint monitoring and cooperative management.

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