

INTERNATIONAL WATER LAW, GROUNDWATER RESOURCES AND THE DANUBE DAM CASE

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ABSTRACT

International water law is generally applied to disputes between states concerning surface bodies of water crossing international borders. Disputes and policy-making over transboundary groundwater resources, however, have traditionally been determined on an ad hoc basis or based on regional custom. This disparate treatment stems primarily from the misunderstood nature of groundwater and its relationship to surface water among government officials, policy-makers, jurists, and others. The result often has been the degradation of subsurface waters on both sides of political boundaries, and unwittingly, of numerous international surface bodies of water.

International concern over regional and global availability and quality of fresh water resources has recently generated reexamination of water use and allocation. As a consequence, there is now a growing belief that international water law should be applied to both surface as well as subsurface water resources equally. This trend has been encouraged, in no small part, by the growing understanding of the indissociable relationship between surface and groundwater resources.

In the recent World Court decision in the Case Concerning the Gabčíkovo–Nagymaros Project (Hungary v. Slovakia), the International Court of Justice considered, among other claims, allegations of transboundary environmental harm to both surface and groundwater resources stemming from the construction and operation of the Gabčíkovo Dam and Danube River diversion channel. While the Court addressed the two states' conduct and relations during the dispute, it gave only cursory mention to the environmental concerns presented. Specifically, the Court did not fully consider the consequences to the region's groundwater resources or the applicable law, but rather reached its conclusion based solely on state obligations as defined by treaty and international law. In so doing, the Court artfully skirted the sophisticated but vexing issues of potential environmental harm and applicable laws, including the implication of international water law to subsurface water resources. Notwithstanding the decision, the facts of the case provide an interesting scenario on which to consider both the relationship between transboundary surface and groundwater resources, as well as the applicable international law.

INTRODUCTION

In this paper we intend to illustrate the perceptual disparities between scientific/engineering and legal communities in analyzing and interpreting problems involving transboundary water resources, and to what extent such disparities affect the outcome of international disputes concerning water resources. We have chosen for our illustration the Gabčíkovo conflict, because it encompasses both, surface, as well as ground water problems. In our treatment of the subject we do not intend to take sides, or justify claim of either of the two riparian states involved in the conflict. The sole objective of this paper is to illustrate the distance between the way the International Court of Justice in The Hague viewed the dispute involving transboundary water resources between Hungary and Slovakia, and the way the problems were presented by the scientific/engineering communities of the two states.

INTERNATIONAL WATER LAW AND GROUNDWATER RESOURCES

Under international water law, states must utilize transboundary water resources in an equitable and reasonable manner (Lipper 1967). Fundamentally, this obligation is a utilitarian concept, employing a cost–benefit analysis that attempts to maximize the beneficial use of limited water resources while minimizing the burdens (Chenevert 1992). Thus, riparian states—states with direct access to a transboundary river—must take into account the interests of all other riparian states in the use of the shared waters, as well as any necessary conservation objectives when implementing projects to use or develop the resource (Moermond & Shirley 1987). Furthermore, in their use of transboundary water resources, states must not cause significant harm to the interests of other states relying on the resource (Goldenman 1990). Harm is defined as “significant” where it results or threatens consequential effects upon the public health, economic productivity, or the environment of another state, or where it materially interferes with or prevents a reasonable use of the water by another State (ILA 1966).

Although both of these principles are conceptually grounded in traditional notions of international law and state relations, they also can be properly placed within the context of science and the sustainable use of resources. Many groundwater aquifers and surface bodies of water traverse borders and boundaries without regard to politics. Those that do not are frequently interrelated with the larger regional hydrologic system and are thus interconnected to surface or groundwater in neighboring states. Consequently, actions of one State that affect the water resources within its territory can very often result in significant consequences to the quality or quantity of water in another state. For example, the development of dams and water-works projects can detrimentally affect water flow and groundwater levels and increase river silting; the diversion of a river from its natural course can deplete or pollute interconnected wetlands and groundwater aquifers. Thus, the principles of reasonable and equitable use and of no significant harm are standards designed to ensure states' interests as well as resolve conflicting interests in a justiciable and fair manner.

The international legal regime regulating the use of transboundary water resources has, until quite recently, focused predominantly on surface bodies of water. Most legislators, policymakers, and international legal scholars considered underground water resources as dissimilar from surface waters with respect to rights and usage; groundwater was, and often still is regarded as akin to a mineral resource and thus omitted from the rubric of international water law. This neglect and misconstruction of the nature of groundwater can be ascribed, in large part, to insufficient understanding among those same legislators, policymakers, and legal scholars of the basic physics of the relationship of surface and groundwater within the hydrologic cycle (Caponera and Alh riti re 1981; McCaffrey 1991). As described above, surface and groundwater resources are typically interrelated, either directly or as part of a larger regional hydrologic system. Thus, interrelated surface and underground waters cannot be used efficiently or protected adequately unless they are considered concurrently under the same rubric of management and law.

In the wake of the ever increasing global population and the growing environmental movement, greater emphasis has been placed on groundwater resources to supplement dwindling freshwater supplies. This increased attention, coupled with the growing knowledge of the science of subsurface water resources, has motivated the international legal community to accept the hydrologic system as a whole and to acknowledge the indissociable nature of surface and groundwater (Utton 1981; Hayton 1990). Various transboundary water arrangements and guidelines now incorporate groundwater resources within their authority, though, the scope of these regulations has not been uniform or comprehensive.

Of particular significance are the International Law Association's Helsinki Rules on the Uses of Waters of International Rivers (as modified by the Seoul Groundwater Rules), and the recently adopted United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses. Both the rules and the UN Convention are generally similar in content, processes and objectives, especially as they relate to surface bodies of water. With regard to groundwater resources, though, the scope of the Helsinki Rules is much broader than that of the UN Convention. The Helsinki Rules use the term *international drainage basin* to describe the water resources encompassed within the geographical scope of the rules, while the UN Convention uses the term *international watercourse*. The difference in scope is delineated by the definitions: an *international drainage basin* is determined by the "watershed limits of the system of waters" traversing two or more states and includes "surface and underground waters flowing to a common terminus" as well as confined transboundary groundwater resources within the watershed; an *international watercourse* includes only surface and groundwater that constitute "by virtue of their physical relationship a unitary whole and flowing to a common terminus." While the first encompasses all streams, lakes and aquifers within a particular drainage basin regardless of their interrelationship, the latter is limited only to water resources *directly* related to a particular river (ILA 1966; ILA 1986, United Nations 1997). Having been formulated by a sub-committee of the United Nations, the UN Convention is likely more authoritative in legal matters concerning transboundary water issues.

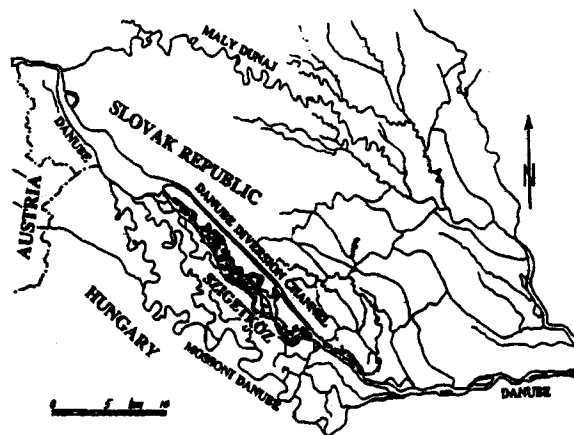


Figure 1. Hydrographic network of the Danube inland delta

HYDROGEOLOGICAL SETTING

The Danube rises in the crystalline complex of Black Forest Mountains of Germany. The river channel in its upper course is determined by the structure of Alpine foreland, flowing first across a narrow belt of Jurassic rocks, and then in soft rocks of *Molasse* formations of the Upper Oligocene and Miocene age. Further down, in Austria, it skirts the southern flanks of the Bohemian Massif, and continues its flow through *Molasse* rocks until it exits mountainous Austria through a hanging valley spilling across the rocky sill of



Devin Gate. Devin Gate separates the eastern Alps from the Carpathians. The river changes drastically its gradient upon entering into the Danubian depression of the Little Hungarian Plain, the site of the Gabčíkovo Danube Dam conflict. The *Little Hungarian Plain* is the northwestern part of the *Panonian Basin*. Most of the depression consists of deltaic Quaternary and recent alluvial sediments, forming an inland delta that has accumulated as the Danube flowed into the landlocked *Panonian* sea. The accumulated thickness of the deltaic sediments has been enhanced by an accelerated subsidence of the *Little Hungarian Plain* since the Carpathian orogenesis. Hence, the majority of the deltaic sequence consists of cyclic intercalations of sand and gravel brought down by the seasonal floods of the Danube. From Bratislava, Slovakia, at the head of the delta, down to Komarno, Slovakia, Danube flows through three main channels forming two main islands, the northern and larger *Velký Ostrov Zitny* on the Slovak side of the border, and smaller *Szigetköz* on the Hungarian side. The central channel of the Danube inland delta separating *Velký Ostrov Zitny* from *Szigetköz* is also the international boundary between Slovakia and Hungary.

The entire area of the Danube inland delta forms a large alluvial aquifer. The river channels in upper part of the delta are influent, contributing recharge to the aquifer at an annual average rate of 30 m³/s, while the channels in the lower part of the delta are effluent, forming large area of wetlands. The aquifer is an important source of water for the local municipal and agricultural entities.

THE DANUBE DAM CONFLICT

The Case Concerning the Gabčíkovo–Nagyymaros Project (Danube Dam Case) involved a dispute between Hungary and Slovakia (formerly with Czechoslovakia prior to the January 1993 dissolution of that country) over the construction of a large barrage system. The scheme, which was developed in the 1960s and 1970s and formalized in a treaty in 1977, was to include a series of dams, canals, hydropower plants and other massive installations on the Danube River, which bordered and flowed through the two countries. During the 1980s, as construction proceeded, Hungary experienced strong pressures from the environmental movement to abandon the project. The scheme was criticized, in large part, because of its potential impact on the groundwater aquifer underlying the region (the largest freshwater aquifer in Europe) and the unique wetland region south of the Danube known as *Szigetköz* (Williams 1994; Liska 1995; Kiss 1997).

Due to the pressure, as well as the changing political circumstances of the late 1980s, Hungary suspended construction operations on 13 May 1989. Both Hungary and Slovakia attempted to negotiate the dispute, but both held steadfast to their positions. In response to Hungary's allegations of potential environmental damage, Slovakia asserted that the ecological doubts were unfounded and that monitoring and subsequent technical corrections would be sufficient to protect the region's natural resources (Vodohospodárska Výstavba, 1992; Liska 1993).

During the discussions, and over Hungary's strong objections, Slovakia implemented a "temporary" measure to divert the Danube River. The so-called "Variant C" was a modification of the original plan, diverting the Danube a few hundred yards upstream from the Hungarian-Slovak border and keeping all operations within Slovak territory (Vodohospodárska Výstavba, 1992).

As a result of the diversion, water flow into the original channel at the point of diversion dropped more than eighty percent causing the water level in the original river channel to drop by two to four meters (Liebe & Tóth 1992). Many area wells dried up, water flow in the *Szigetköz* region slowed to a trickle, large fish kills were reported, hundreds of other animal and plant species came under threat, and the rate of particle-settling in the river increased significantly (CEC 1993; Maass 1992; Tamayo 1992). The latter effect was especially troubling as it threatened the filtration capacity of the Danube's riverbed and increased the likelihood of aquifer contamination.

Soon after the diversion, on 19 May 1992, Hungary formally renounced and canceled the 1977 treaty. Following additional efforts to reach a compromise, including by the European Union, the two countries submitted their dispute to the International Court of Justice (World Court) on 2 May 1994. The Court's decision was handed down on 26 September 1997.

THE DANUBE DAM CASE

Until the Danube Dam Case, the International Court of Justice had never considered transboundary water issues. In fact, the Danube Dam Case was the first opportunity afforded the World Court to consider and rule on allegations of transboundary environmental harm. The case also offered a unique opportunity for the application of international water law to questions related to the use and ownership of transboundary groundwater resources. Finally, it presented the possibility for advancing international water law and applying an integrated approach to the management and protection of shared water resources.

To justify the validity of the suspension and subsequent cancellation of the 1977 treaty, Hungary claimed a state of ecological necessity. In support, they submitted extensive scientific data and studies forecasting significant environmental injury. Slovakia countered with equally voluminous analyses and data refuting Hungary's conclusions, and justified the diversion of the river based on a right to take appropriate countermeasures and mitigate losses (ICJ 1997).

Acknowledging the scientific evidence, the Court made a noteworthy effort to demonstrate "the great significance that it attaches to respect for the environment, not only for states but also for the whole of mankind" (ICJ 1997, parag. 53). Nonetheless, the Court declined to consider the value of the data or its validity as presented by both sides and asserted that "it is not necessary . . . for [the Court] to determine which of those points of view is scientifically better founded" (ICJ 1997, parag. 54). Further, it eluded the need to substantively address concerns of actual and potential environmental damage and the applicable laws, including the implication of international water law to subsurface water resources.

The Court instead resorted to traditional notions of international treaty law, which provide only limited and very strictly defined circumstances under which Hungary's state of ecological necessity argument may be invoked to justify the abrogation of treaty obligations. While the Court acknowledged the natural environment as an "essential interest" of nations worthy of protection at the highest levels, it determined that the threats asserted by Hungary did not rise to the level of "grave and imminent peril" (ICJ 1997, parag.



54). Effectively, the Court considered the risk of environmental damage asserted by Hungary as not justifying the suspension and subsequent termination of the 1977 treaty. The Court reached this conclusion in spite of its unwillingness to evaluate the merits of the scientific data presented.

After declaring Hungary's suspension and subsequent termination of the 1977 treaty illegal, the Court acknowledged Slovakia's right to respond to Hungary's actions and obligation to mitigate its losses. In addressing Slovakia's diversion of the Danube River, the Court recognized the legal interests of all riparian states to the use of a shared river, and acknowledged the recent adoption of the aforementioned UN Convention (ICJ 1997).

Ultimately, though, the Court's decision that Slovakia was not entitled to divert the river was based on principles other than international water law. The Court first noted that any action taken must conform to the scope and fulfill the primary objective of the original agreement. The Court found that the unilateral act of diverting the river "differed sharply" from the cooperative nature of the 1977 treaty and thus constituted an "internationally wrongful act." The Court further asserted that as an illegal act, the unilateral diversion could not qualify as valid mitigatory measures as mitigation efforts may never justify an otherwise wrongful act (ICJ 1997).

Finally, the Court declared that responsive action or countermeasures might be valid so long as they are proportional to the action causing the injury. Here, the Court explained that the consequences of Slovakia's actions in unilaterally diverting the Danube were disproportionate to the injury suffered by the suspension and termination of the treaty because they deprived Hungary of its fair share of the river "with the continuing effects of the diversion of these waters on the ecology of the riparian area of the Szigetköz" (ICJ 1997, parag. 85).

Again, the Court made its determination without actually evaluating either the quantitative or qualitative "effects" on the region's environment, or the data suggesting the amount and quality of water required to maintain a balanced natural and human environment. In so doing, it also disregarded the applicable law, including the implication of international water law to subsurface water resources.

DISCUSSION

Application of international water law to the Danube Dam Case could have been particularly useful to delineate both the interests and the obligations accorded to Hungary and Slovakia under international law with regard to the use of internationally shared water resources. It would also have defined, with more particularity in the environmental context, what level or type of damage may give rise to liability under international law. Finally, it could have provided additional clarification in the development of international law as it pertains to groundwater resources. Nevertheless, the Court in this case avoided international water law principles and instead relied on conventional treaty law.

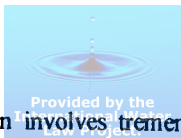
Both Hungary and Slovakia have distinct rights and interests in the water resources of the Danube River and underlying aquifer. The Danube River borders and flows through both states, as does the underlying aquifer, thus entitling both countries to some measure of the surface and groundwater. Further, Hungary and Slovakia both rely on these resources for industrial, municipal, commercial and recreational uses. In addition, and as a direct corollary, both states have a stake in the conservation and prudent use of these waters; both are obligated to ensure the reasonable and equitable use of these resources *vis a vis* the other's rights and interests in the water, and that any use does not cause significant harm to the interests of the other State.

Considering these rights, interests and obligations raises various issues, many of which were not addressed in the Court's decision. One of the more conspicuous, related to Hungary's suspension and termination of the 1977 treaty, concerns the level of likelihood of environmental damage that is necessary to justify the suspension or termination of a contract or treaty. In this case, the Court asserted that although Hungary's allegations of environmental harm were substantial and serious, they did not suffice to establish "grave and imminent peril" as required to show a state of necessity (ICJ 1997). This conclusion, however, fails to consider the possible consequences if in fact they prove true. Hungary has a significant stake in the quality and quantity of river and aquifer water available for its use. This stake pertains not only to its industrial, municipal, commercial and recreational needs of the water, but also to the needs of Hungary's natural environment. Any harm to its water resources could have dire consequences not only on Hungary's economy, but also on its population. Further, damage to the environment is often incomprehensibly serious. B environmental damage typically requires years or decades of remediation at huge costs; some damage is completely irreversible.

While this argument does not suggest lowering the threshold for the level of environmental harm required to justify "necessary" action, it does implicate a need for the Court to better understand the relevant science and to evaluate and consider substantively scientific evidence when addressing allegations of actual or future environmental harm. Although such evidence might be considered beyond the scope of the Court's expertise, it is far from irrelevant and certainly cannot be discounted. To do so would allow the Court to ignore evidence that is at the very heart of the case. The Court must therefore become more educated about science and its relationship to legal issues and must not avoid addressing the merits of scientific evidence. Short of selecting judges versed in the various sciences, the Court might appoint impartial experts to evaluate the data and to submit analyses and conclusions, as has been done in many domestic jurisdictions.

Similarly, laws aimed to protect both the human and natural environment often lack scientific underpinning and are inadequate or utterly ineffective when confronted with scientific reality. This suggests an analogous avoidance among legislators and policy-makers to incorporate, or give weight to, science within the legislative process. The oft-joked-about maxim that the law trails scientific discovery by ten to twenty years is more a reflection of ignorance within the legislative process than an incompatibility of science and the law. Scientific information must be used as the basis upon which to develop new rules and laws, especially those related to the environment, in order to ensure pragmatic decision. As such, scientific data and new discoveries must be embraced within the decision-making process and scientists and technicians utilized for their expertise.

The inclusion of scientific information in this manner effectively requires proactive rather than reactive approaches to developmental and regulatory initiatives, especially when confronting situations of potential environmental damage in the future. Ecological damage



often involves tremendous costs in remediation efforts, costs that are typically not known or revealed at the outset of a project. Environmental damage, however, is not merely a financial concern; it has the potential to affect both the human environment and human life. Science, however, cannot always provide conclusive answers as to what kind or how serious the consequences might be. Moreover, science alone is often inadequate to evaluate the various risks involved, especially when one risk must be weighed against another. Typically, social, political and moral considerations are also implicated. Where the possibility of damage to the environment resulting from a particular activity is scientifically inconclusive or insufficient, decision-makers must take a precautionary approach in the implementation of that activity.

While not a normative expression of international law, the *precautionary principle* is widely acknowledged as a guideline for situations of scientific uncertainty. The principle provides that in the absence of scientific certainty, steps should be taken in anticipation of possible environmental harm to ensure that this harm does not occur. In more traditional words, an ounce of prevention is worth a pound of cure. Though it does not delineate precise levels of acceptable and unacceptable risk, this principle does require a balancing of the various risks and interests involved. *B e . g .* , the risk of proceeding with the project versus the risk of abandoning the project. As such, it is an essential guideline to ensure that evidence of potential environmental harm is evaluated appropriately.

While the Court in the Danube Dam Case determined that the potential damage was not so imminent as to justify a state of ecological necessity, it did not discount the likelihood of future environmental harm resulting from the project. In fact, it acknowledged that there is "abundant evidence" that the project's impacts on the environment "are considerable" (ICJ 1997, parag. 140). Nonetheless, the Court placed greater emphasis on the costs already invested in the dam scheme and asserted its awareness of the "considerable financial losses" that would arise from abandoning the project (ICJ 1997, parag. 72). In so doing, the Court neglected to address the social or economic costs associated with possible future harm stemming from operation of the dam scheme. In particular, it failed to consider the risks of proceeding with the project *vis a vis* the risks of modifying or abandoning it. Furthermore, this omission had a second and possibly more profound result: it effectively relegated the state of the environment as a secondary concern under the law behind financial investment.

Finally, with regard to both Hungary's and Slovakia's conduct, the question arises whether their respective actions were valid *vis a vis* international water law. As noted above, both Hungary and Slovakia have substantial rights and interests in, as well as obligations toward, the waters of the Danube River and the underlying aquifer. As the aquifer is directly related to the Danube River watercourse and both flow to a common terminus within the same drainage basin, regulation of and harm to the groundwater, as well as the surface water, can be considered in the context of both the Helsinki Rules and the UN Convention. Thus, it becomes an evidentiary issue as to what rights or interests (if any) were affected by each State's action: whether Hungary's suspension and subsequent termination of the 1977 treaty detrimentally affected Slovakia's rights or interests in the use of the water resources; whether Slovakia's response of diverting the river injured Hungary's rights or interests in the use of the water resources. Undoubtedly, such evidence includes scientific data that requires special attention by the Court.

CONCLUSIONS

The Danube Dam Case involved substantial threats of harmful impacts upon the natural environment, including the large freshwater aquifer underlying both Hungary and Slovakia. The World Court, in reaching its decision, only glossed over international water law and certainly did not consider the application of such law to transboundary groundwater resources. Further, while the Court laudably recognized the significance of the environment and priority as an essential state interest, it nonetheless subordinated the state of the environment to development and financial concerns. These outcomes were in large part the result of the Court's unwillingness to substantively consider the scientific evidence presented by the parties as well as concerns of actual and potential environmental damage.

While decisions in the international arena are not considered precedential, the ruling in the Danube Dam Case will likely be regarded as persuasive in subsequent decisions, if only because it was pronounced by the International Court of Justice. As such, it raises concern for future cases involving economic development projects, transboundary resource management and actual or potential environmental damage. Nonetheless, the case provides a unique opportunity to reexamine the political, legislative and judicial processes, both on the domestic and international levels, in the context of environmental issues.

There is presently an absence of scientific knowledge among government officials, legislators, policy-makers, jurists, and legal scholars. This situation often results in significant problems of inadequate protection, mismanagement, and certainly damage to natural resources and the environment. While this shortcoming is not solely responsible for all of the world's environmental ills, the inclusion and understanding of technical information in the decision-making process can only serve to achieve more balanced, scientifically based, and thoughtful decisions. Thus, the technical and scientific community must become more involved within the political, legislative and judicial processes, either directly as active participants or indirectly as consultants and experts. Further, scientist and technicians must be embraced within policy and law-making efforts and the adjudicatory process in order to ensure that the realities of science are appropriately incorporated into regulations and decision.

As science develops and operates on the frontiers of knowledge, the law must keep apace and must continually adapt to new scientific discoveries and developments. Where the science is inconclusive, it must evaluate the possible consequences and risks in order to address adequately the needs of society. Only through a full understanding of the various legal, policy *and* scientific issues involved will states be able to use, manage and protect their shared resources appropriately, effectively, and in such a way that the resources suffice for present needs and are preserved for future generations.

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