Openness, Sustainability, and Public Participation: New Designs for Transboundary River Basin Institutions

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The world's transboundary environmental institutions typically are driven from the top, function behind closed doors, disregard sustainability, and rely on technical fixes or regulatory mechanisms. This article compares those approaches, as manifested in various river basin commissions, to a new, more democratic model being tested in the U.S.-Mexico border region. Water factors into many transboundary environmental problems. More than 300 river basins are shared by two or more countries. The authors examine seven international river basin compacts, sketch four common conceptual paradigms, and argue that these models mostly ignore local needs and public inputs and sometimes also fail in their explicit objectives. The border between the United States and Mexico offers a more promising design. There, as a result of the 1993 North American Free Trade Agreement, a new, innovative authority, the Border Environmental Cooperation Commission (BECC), has emerged. This institution has been fashioned to protect local interests and to sustain its activities environmentally and financially. We examine how well the BECC has fulfilled its promise of openness, transparency, and binationality, and conclude that properly adapted, the model's roots—openness, transparency, capacity building, bottom-up design, and sustainability—could take hold in other transboundary areas.

From the earliest recorded histories, regions at the peripheries of nation-states have held special fascination and posed particular problems for those who ruled at the center. Throughout the ancient world, in China, India, Mesopotamia, Egypt, Persia, Greece, and Rome, security from external threats was seen as paramount if power was to be maintained. The borders of these empires were viewed as vulnerable points of entry, regions where contrasting, and often belligerent, cultures met and mingled. Whether on the Mongolian steppe, the Hindu Kush mountains, the Anatolian plateau, or the Scottish lowlands, borderlands were perceived by ruling oligarchies as zones of potential hostility, peopled by cultural inferiors. For this reason, boundaries had to be either continuously extended or fortified (Gibbon, 1820; Hiuen Tsiang, 1957; Kautilya, 1956).

Concomitant with the social construction of border areas as menacing and dangerous, these areas were marginalized by central administrative

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structures. Although border regions were to be defended, pacified, exploited, and even settled, they were rarely integral to the identity of the state except when modified by the colonial concept of "frontier" (e.g., the western United States or the Brazilian Amazon). This notion of peripheralness persists, even as the significance of distance has been diminished by advances in technology and the growth in transborder exchanges of population and goods (Kristof, 1959). Today, the importance of border zones continues to be minimized even by the wording used to identify them: boundary, periphery, edge, fringe, perimeter. Centers, on the other hand, are still conceived as the hub, heart, nucleus, or core of a nation.

Within such a framework—one that views border regions as fringe areas—it is not surprising that management of both natural resources and environment has been problematic. If over the centuries nations have rarely succeeded in achieving amicable relations with their neighbors, what is the likelihood of effectively sharing resources and habitat? What are the prospects of valuing long-term over short-term gain? As population grows and human agency increases its dominion over nature, detrimental environmental change can surely be expected to increase.

Why should natural resource and environmental management in border areas merit special consideration? Often potential tinderboxes, borders are places where perceived inequities simmer, conflict incubates, and hostilities erupt. The past 200 years, and especially the past few decades, have witnessed hundreds of wars and border disputes driven by ethnic antagonisms, expanding populations, and lust for resources.[1] In the 1990s alone, the collapse of the Soviet Union and its client states has reconfigured the world's political landscape, with 49 new international boundaries and an altered mosaic of border regions having emerged. Many of the new political borders apportion natural systems to two or more nations, imposing different and sometimes conflicting management regimes on holistic natural systems that would benefit from harmonized regulation and ecosystem-based management. Not only do borders fragment management, they often provide incentives for opportunistic exploitation of resources. As a result, many environmental problems have become more serious by virtue of their internationalization.

Water is a factor in many particularly acute transboundary environmental problems. More than 300 river basins, accounting for nearly 50% of the earth's land surface, are shared by two or more countries (Dowdeswell, 1998). Since 1814, states have negotiated approximately 300

1. In 1994 alone, for example, there were 31 major armed conflicts around the world, all internal in origin (although some, such as Nagorno-Karabakh and Bosnia-Herzegovina, had interstate implications) (Stockholm International Peace Research Institute, 1995).

treaties that deal with nonnavigational issues of water management, flood control, hydropower projects, or allocations for consumptive or nonconsumptive uses in international basins (Hamner & Wolf, 1998).[2] The sheer number of treaties underscores the tensions that divided basins can engender; often, the impetus for interstate accommodation was the avoidance of open conflict.[3] The fact that so many compacts exist supports the notion that nations regard water as property and highlights the fact that countries rely on uninterrupted, relatively clean water supplies.[4]

Existing analyses of water compacts fall short by ignoring *place*, a vital component when considering the viability of treaties. These studies' academic, legalistic approach tends to ignore real tensions among parties to accords, and thus their conclusions rarely conform with observations (McCaffrey, 1993). Comprehensive examinations of *how* international river basins are managed are noticeably absent. In this article, we sketch four "paradigms" (or conceptual models; i.e., what we consider to be dominant themes) pertinent to management of international river basins. Both in regional and transboundary resources issues, these paradigms mostly omit local needs; in some cases, they also fail to meet their explicit objectives. Seven international river basin compacts on four continents form the sample for our analysis under the paradigms. For different reasons having to do with geographical and historical contexts, as well as each signatory's set of values and customs, several of these accords have evolved dysfunctionally, as we proceed to discuss.

Finally, for a more promising model, one fashioned to promote sustainable development, we turn to the U.S.-Mexico border where, as a result of the North American Free Trade Agreement (NAFTA), a new transboundary authority, the Border Environment Cooperation Commission (BECC), has emerged. The BECC differs from extant river basin accords in that it addresses first the concerns of the residents of the border region. In effect, the border region now initiates policy instead of simply receiving central policy decisions. An evolutionary step where sustainability issues are concerned, the BECC's innovative paradigms may aid in reconstructing and reinvigorating other transboundary accords.

2. For compiled major findings from a database containing 145 international water treaties, see Wolf and Hamner (1998).

3. Whereas two thirds of these treaties are European or North American, all countries in sub-Saharan Africa share one or more international river basins—there are 54 rivers or water bodies that are boundary or transboundary in the region (Rogers, 1992; Sharma et al., 1996).

4. Many nations are already water scarce when considering per capita basic needs, and the situation will only worsen as populations grow (Butts, 1997; Falkenmark, 1986, 1989).

Why Focus on River Basin Accords?

Although river basin accords are but a subset of environmental institutions in general, they are the most typical of transboundary resource management institutions. As such, river basin accords exemplify a situational response wherein the central concerns of each nation take center stage; as a result, the concerns, needs, and aspirations of people in peripheral border regions where these rivers are located are largely ignored.

Furthermore, we focus our analysis on these accords because they best exemplify the competing values embedded in natural resource management—conflict versus cooperation, openness versus secrecy, established cabals versus public values, use versus environmental protection, overallocation versus conservation, and sustainability versus the desire for immediate economic returns.

River basin accords are illustrative, too, because water is usually the most critical and contested natural resource or environmental condition. Traditionally, the issues in contention have focused on quantitative allocations and navigation rights, both of which are important requirements for economic development. Historically, therefore, accords and their overseeing organizations were the first institutions to address transboundary natural resources. Other environmental issues are much more recent arrivals, even in developed countries, and the institutional structures to address them are newer and weaker. For these reasons, river basin accords offer the most venerable, most elaborated, and most common examples for study. Finally, other transnational environmental commissions, where they exist, have largely been patterned after river basin commissions.

Clarifying the terminology used in our river basin examples, we distinguish *boundary* from *transboundary* river systems. Boundary rivers form a boundary between two or more nations. Transboundary rivers flow across international boundaries and create upstream/downstream riparians.

Four Common Paradigms in River Basin Accords

Four conceptual paradigms have historically dominated international environmental accords: (a) technical/scientific, (b) regulatory/standard-driven, (c) closed, and (d) top-down. Markedly different in their theoretical form, in practice the four paradigms are interconnected, and in the real world, elements of each often merge.[5] We encapsulate the compo-

5. Compliance with international accords is a significantly different issue, one not examined in this article. See, for example, Jacobson and Weiss (1995).

nents of each paradigm in flow charts (Figures 1-4). Readers should recognize that these figures generalize our view as to how each paradigm's parameters coalesce into operationalized policy; they are not intended to encompass any one specific accord's procedures or implementation. The figures are instead intended to provide a visual image of the complex steps involved in the four different paradigms of river basin management, and we encourage their use as stand-alone conceptual models.

THE TECHNICAL/SCIENTIFIC PARADIGM

International accords establish concrete goals in technical/scientific paradigms, but management is mostly delegated to organizations dominated by scientists and engineers. These experts are given broad authority to prioritize issues to be addressed, choose tools and targets, and determine the extent of public involvement.

This paradigm (Figure 1) is especially attractive among negotiators of international accords. Governments are reluctant to relinquish control or sovereignty over border issues and especially over natural resources, which are often regarded as a national heritage. Consequently, international accords commonly establish special authorities to manage river basins, usually under the direction of organizations dominated by hydrologists and engineers. Overt conflict can be avoided or postponed if experts—regardless of nationality—reach agreements based on their "scientific judgment." This, then, is the weakness of this paradigm: Too much discretion over critical social/environmental policy is allocated to engineers, who are often ill-trained to assess the potential adverse effects of their constructions. We illustrate this tendency by a short description later in this article outlining the social and environmental consequences of the Aswan Dam.

Example: The Rhine Commissions

Six nations share the longest river in western Europe, the 1,230-km (770-mile) Rhine, with tributary rivers passing through two others.[6] The drinking water source for many riparian communities, upstream pollution events can result in the water becoming unsafe for human consumption.[7] The river has been estimated to carry somewhere in the order of

6. The Rhine is boundary to Switzerland-Liechtenstein, Switzerland-Austria, Switzerland-Germany, and Germany-France; it is transboundary to Germany and the Netherlands. Its source is in the Swiss Alps. The two major tributaries, the Meuse and the Moselle, add Belgium and Luxembourg to the Rhine basin.

7. In 1986, for example, the Sandoz Company accidentally discharged large amounts of disulfoton (an insecticide based on a nerve gas), thiometon (another insecticide), and ethoxyethylmercuryhydroxide (also an insecticide, which is toxic to mammalian kidneys and can be a potent neurotoxin). In the same year, the Ciba-Geigy Company released atrazine (an herbicide).

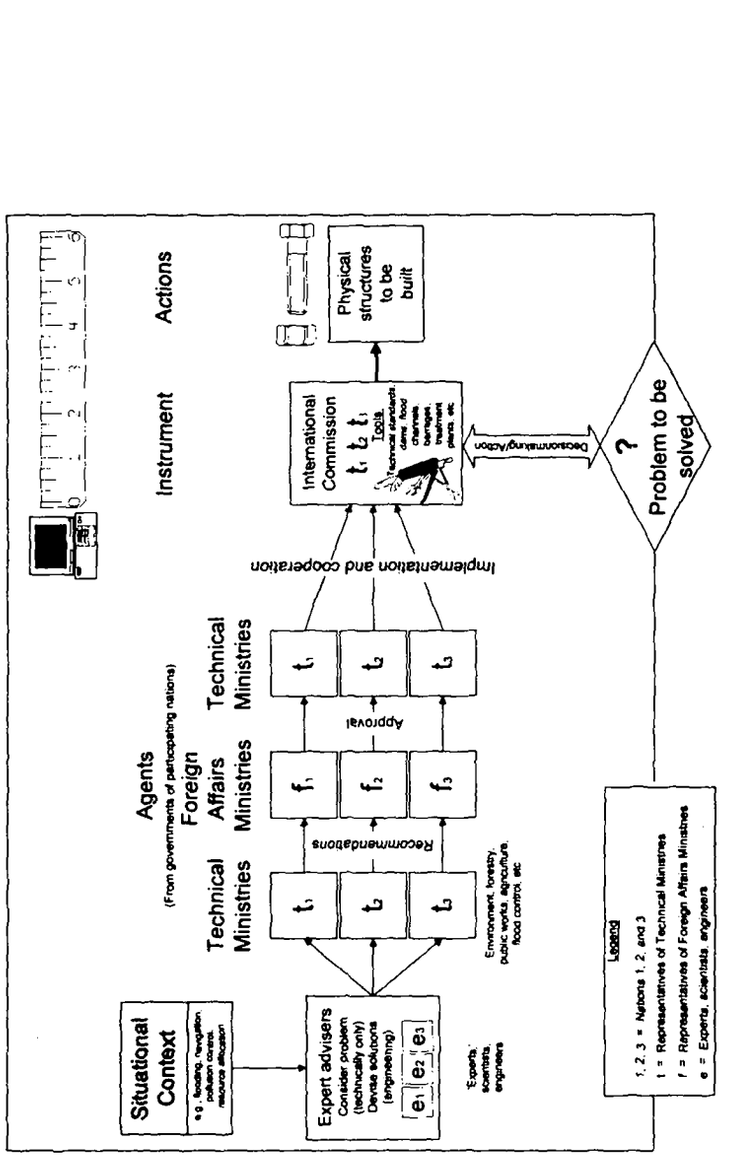

Figure 1: The Technical/Scientific Paradigm

100,000 different foreign substances, few of which have been regularly monitored. Impairments to the ecology of the river and the Wadden Sea into which its delta debouches have arisen, with several species locally extinguished or imperiled. Although the Rhine's water quality since the 1970s has generally improved by a factor of 10, this has not yet been reflected in many biological organisms because of the processes of bioaccumulation and storage of pollutants in fatty tissue (van Ast, 1991). However, the return to the river of Atlantic salmon in 1990 heralds a new era of a cleaner, healthier waterway (Chichester, 1997).

The Rhine reached its heavily polluted state despite being regulated by two commissions. The first, the Central Commission for the Navigation of the Rhine, was established by the Congress of Vienna in 1815; the central commission's present statute dates from the 1868 Convention of Mannheim. Members are Belgium, France, Germany, the Netherlands, Switzerland, and the United Kingdom; each nation has one representative on the commission, which votes by plurality. The mandate of the central commission in dealing with environmental problems in the Rhine is limited to navigation: Only if the cause of the pollution stems from navigation can the central commission become involved.

Because of this limitation and at the urging of the Netherlands, the farthest downstream nation, in 1963 the International Commission for the Protection of the Rhine Against Pollution was created. Members are the Netherlands, Germany, France, Luxembourg, and Switzerland. These nations are instructed to make progress reports by the subsequent 1976 Rhine Chemistry Treaty (the Bonn Convention). In 1988, in an attempt to accelerate environmental policy, the Rhine nations concluded the Rhine Action Plan with four goals: to create conditions for the return of larger vertebrates, to safeguard the drinking water supply, to eliminate sediment pollution by hazardous compounds, and to protect North Sea ecology (Stein, 1972; van Ast, 1991).

However, national authorities, rather than the international commission, assume primary oversight for water pollution, pursuant to their own legislation and only in their own territories. Many of the national laws and pollution cleanup plans have been adopted under obligations imposed by the European Union (EU), which has enacted directives targeting pollution of the aquatic environment. Implementation of these directives is often hampered by a lack of coordination between the responsible authorities. In the Netherlands, for example, four ministries, two national agencies, one national institute, two national inspectorates, regional and provincial water agencies, and a host of local water treatment agencies, offices for water and environment, and technical offices for the environment are all directly involved in making and executing water policy (van Ast, 1991).

The international commission's mandate is to prepare and implement research to determine the nature, quantity, and origin of pollution of the

Rhine, and analyze subsequent results. It can advise both the EU and national governments on pollution prevention measures. It is entrusted to coordinate future arrangements among signatory parties concerning the protection of the Rhine. But, in the absence of authorization from signatory governments, it cannot even table an issue for consideration. Its independent power, therefore, is thwarted at the outset.

Furthermore, although designed to centralize the pollution issue, operationalization of the international commission's mandate is impeded by the central commission, which retains jurisdiction over navigation-related pollution issues (Stein, 1972). Perhaps the major weakness of the Rhine Action Plan and its agent, the international commission, is that it is overlain by the older central commission, which is responsible only for navigation. Such entirely different mandates between the two commissions could have counteracting effects. For example, the central commission may require dredging of the riverway for navigation; such dredging is notorious for stirring up sediments that contain high levels of pollutants such as pesticides and heavy metals, remixing these into the water column.

Example: The Israel-Jordan Joint Water Committee

In the region of the Jordan River basin, given present rates of population increase, within a few decades all available water will have to be dedicated to domestic use, and, according to the Middle East Water Commission, unless zero population growth is attained, eventually no amount of conserved, developed, desalinized, or imported water will suffice (Middle East Water Commission, 1997).[8] The ongoing competition over Jordan River basin waters is complex. The Jordan River's discharge is less than 2% of that of the Nile, but it is exceptionally important to the countries involved: Israel, Jordan, Syria, Lebanon, and the new Palestinian entity. The Jordan River is fed by four upstream flows: the Dan, the Hasbani, the Banias, and the Yarmouk.

The Jordan River system has been the site of more international conflict over water than any other river basin in the Middle East (Naff & Matson, 1984). The Arab Headwater Diversion Project, begun in 1965, planned to divert water from the Hasbani and Banias through Syria to the Yarmouk. Israel responded with a series of aircraft and artillery attacks on the diversion project, culminating with raids into Syria in 1967 that presaged the subsequent Six Day War (Morris, 1997). Some scholars believe that Israel's decision to occupy the West Bank during the 1967 Six Day War was at least in part prompted by the desire to secure water from the Jordan and the area's underlying aquifers (Amery, 1997; Shapland,

8. In 1993, the Committee on International Waters of the International Water Resources Association convened a Middle East Water Forum in Cairo. This forum resulted in the establishment of the Middle East Water Commission, whose mandate was to analyze the future provision of water for the populations living in and near the basin of the Jordan River.

1997). Beset by armed Palestinian attacks from Jordan into these occupied territories, in 1970 Israel bombarded the East Ghor Canal, which conveys water from the Yarmouk southwards to the Jordan Valley, as a means of pressuring Jordan to act against the Palestinians (Nachmani, 1997). Yet, quietly and tacitly, Israel and Jordan largely acquiesced to the apportionment and noninterference terms contained in the nonratified 1955 Revised Unified Plan proposed by U.S. envoy Eric Johnston for sharing the Jordan basin's waters (Shapland, 1997).

As a result of capturing territory in the 1967 Six Day War and carving out a security zone in southern Lebanon, Israel is now the de facto upstream state for most of the Jordan River basin. This gives Israel substantial control over and access to the major share of the Jordan River water (Butts, 1997). Jordan believed itself to be extremely vulnerable, since the majority of its water comes from the Jordan River. Recognizing the centrality of water equity, Israel and Jordan included water during negotiations leading to a bilateral peace treaty. The water dispute between the two states was resolved based on mutual recognition of "rightful allocations."

On July 25, 1994, Israel's Prime Minister Yitzhak Rabin and Jordan's King Hussein signed the Washington Declaration, ending the state of belligerency between the two nations. Israeli and Jordanian bilateral delegations negotiated the subsequent Treaty of Peace, signed on October 26, 1994 (Israeli Ministry of Foreign Affairs, 1999a). Notably, water-related items preceded security issues, borders, and territorial matters in the agenda that led to the finalized treaty (Kliot, 1995; Wolf, 1996). Acknowledging that "water issues along their entire boundary must be dealt with in their totality," the treaty spells out allocations for both the Yarmouk and Jordan rivers, as well as Arava groundwater, and calls for joint efforts to prevent water pollution. Article VII of Annex II to the peace treaty established the Joint Water Committee (IJJWC), comprising three members from each country.[9] Nebulous at its inception, the IJJWC was to specify, with the approval of the respective governments, its work procedures, the frequency of its meetings, and the details of its scope of work. The IJJWC was tasked to (a) seek experts and advisers as required and (b) form, as necessary, a number of specialized subcommittees and assign them technical tasks. Specifically agreed to were a northern subcommittee (responsible for the transnational and international 360-km Jordan River and its principal tributary, the Yarmouk, to a point a few

9. IJJWC members come from diverse backgrounds. Israel is represented by a former director general of the Ministry of Agriculture (who once headed the ministry's agricultural research division), a former brigadier of the Israel Defense Forces, and a lawyer. Jordan is represented by the former secretary general of the Jordan Valley Authority, the chief engineer of dams and irrigation in the Ministry of Water and Irrigation, and a hydrologist (M. Ben-Meir and D. Mahasneh, co-chairs of the IJJWC, personal correspondence, August 27, 1998).

kilometers south of the rivers' confluence) and a southern subcommittee (responsible for the arid Arava region south of the Dead Sea), both charged with the actual management of mutual water resources in these geographic areas (Israeli Ministry of Foreign Affairs, 1999b, 1999c). The two countries undertook to exchange relevant data on water resources through the IJJWC and agreed to cooperate in developing plans for purposes of increasing water supplies and improving water-use efficiency.

Annex II to the peace treaty spells out in detail the terms of agreement between the two countries with regard to water resources. Specified volumes of water are to be used, stored, and transferred by and to each country during a "summer" season and a "winter" season. Because Israel is to provide only 50 million cubic meters per year of additional water to Jordan, insufficient to allow the Jordanians to cover their annual shortfall (Farinelli, 1997), the two countries agreed to cooperate in finding sources for the supply to Jordan of an additional quantity of 50 million cubic meters per year of water of drinkable standards. To this end, the IJJWC was to develop, within one year from the entry into force of the treaty, a plan for the supply of the additional water to Jordan.

Water quality is also designed into the agreement. The two countries undertook to protect, within their own jurisdictions, the shared waters of the Jordan and Yarmouk rivers, as well as Arava groundwater, against any pollution, contamination, or harm. To that end, each country is to jointly monitor the quality of water along its boundary, building monitoring stations to be operated under the guidance of the IJJWC.[10] Israel and Jordan are each to prohibit the disposal of municipal and industrial wastewater into the course of the Yarmouk or Jordan rivers before treatment to standards allowing unrestricted agricultural use. Finally, the quality of water supplied from one country to the other at any given location shall be equivalent to the quality of the water used from the same location by the supplying country. The two countries are to protect the water systems used in the course of these transfers against any pollution, contamination, or harm.

Interpretation of several terms in Annex II has at times had an uneven history. On the positive side is the June 1995 completion of a pipeline connecting the Jordan River immediately south of its exit from Lake Kinneret (the storage reservoir for 20 million cubic meters of water Israel abstracts from the Yarmouk each winter, destined for Jordan during the summer) to the King Abdullah Canal ("Israel Starts Pumping," 1995). Also, the provision of the additional 50 million cubic meters per year Israel promised Jordan went ahead on schedule. However, Article I clause 3, which calls for cooperation so that Jordan acquires 50 million cubic meters more water per year, led to a "mini crisis" between the two

10. As of August 1998, these water quality monitoring stations had not been built. According to Ben-Meir (personal correspondence, August 27, 1998), it is a question of priorities, with the first priority being the increase in Jordanian water supplies.

countries in May 1997 (Yudelman & O'Sullivan, 1997). At the heart of the dispute was Jordan's demand for an immediate transfer of 50 million cubic meters, which was to have been obtained by the construction of two internationally financed dams in Jordan. However, neither Jordan nor Israel was successful in obtaining the necessary financing, prompting Jordan to claim that the peace treaty does not link international funding for dams to Israel's commitment to provide the water (Rodan, 1997). The mini crisis, so dubbed by Israeli Prime Minister Netanyahu, was resolved by the end of May, but not without casualties within the Israeli diplomatic corps. The Israeli ambassador to Jordan resigned because he (and thereby the Foreign Ministry) had not been informed by the prime minister's office of a "secret" meeting that Netanyahu held with Jordan's King Hussein and Crown Prince Hassan in Aqaba to try to resolve outstanding water issues (Rudge, 1997). In the end, Israel agreed to supply Jordan with 25 million cubic meters of water for 3 years as an interim solution (Harris, 1997), following which some other source must be found.

The 50 million cubic meter allotment will most likely be supplied, eventually, by desalinated brackish water originating in Israeli fish farms of the Bet Shean Valley. Israel has offered to pay one half of the estimated $100 million price of the desalination plant. A Japanese commercial firm has been willing to invest in the other half of the plant's construction cost and has offered to supply water to Jordan for 10 years at no cost by adding the annual maintenance and operations costs to its original investment. Despite the fact that the cost of desalinating brackish water is around one third that of desalinating sea water, Jordan contended that it could not afford the price, and former Minister of Water and Irrigation Hadadim rejected this plan. The desalination project is far from dead, however. The Israeli water commissioner (and co-chair of the IJJWC) has resurrected a near-identical infrastructural solution, one where the fish farms in the Bet Shean Valley will reduce their water demand by 90%, which, together with sewage from the cities of Tiberias and Bet Shean treated to agricultural standards, will be sufficient to supply the quantity needed. Concomitantly, using these waters will improve water quality in the Jordan River, since one of the principal sources of pollution has been the fish ponds' discharge; also, treating the municipal sewage will eliminate pollutant seepage into the Jordan basin. According to the Israeli co-chair of the IJJWC, the fish-farming Kibbutzim and the Jordanians have approved the technical approach of this proposed solution, and investment is being sought for two demonstration plants (M. Ben-Meir, personal correspondence, August 27, 1998). According to the Jordanian co-chair (D. Mahasneh, personal correspondence, August 27, 1998), not only is there no agreement yet on the exact solution, but Jordan's preference is to receive water directly from Lake Kinneret (the Sea of Galilee).

Among the other solutions put forth to resolve Jordan's water needs is one that requires Jordan to abandon plans to coconstruct with Syria a dam on the Yarmouk at point 121, for which securing funding is highly improbable. Instead, Jordan could build a weir at point 121 to improve diversion into the King Abdullah Canal. Israel and Jordan agree in principle that this proposed weir will also divert 40 million cubic meters each year into temporary storage in Lake Kinneret.

According to the Israeli co-chair (M. Ben-Meir, personal correspondence, August 27, 1998), both parties are doing their best to minimize any threat of a new political crisis over water, always a possibility given that Annex II "sold every cubic meter at least twice." The co-chairs of the IJJWC communicate by phone at least once weekly, and both acknowledge that the relationship between them is extremely cordial. The IJJWC formally meets once or twice a month, engaging in cooperative discussions of issue resolutions rather than negotiations (D. Mahasneh, personal correspondence, August 27, 1998). Technical experts from both sides meet frequently. Although formal public input to the committee is lacking, both sides receive informal public input through their respective offices, which can be communicated to the opposite delegation if deemed appropriate and necessary.

Summary

The Rhine Action Plan neither facilitates cooperation in the international arena nor comes to grips with the many competing domestic agencies active in water issues, as the case of the Netherlands illustrates. The result has been a cacophony of voices and a weak system that is incapable of regulating and enforcing water quality standards. Rather than being a coordinating body for competing interests, the Rhine Action Plan views pollution as a purely technical problem, to be resolved by scientific studies and technical solutions. Nor does the common EU Environmental Policy yet offer a viable alternative to the Rhine Action Plan: Although the EU has identified a priority list of 129 dangerous substances in water, existing EU legislation covers only 17 of them (European Environment Agency, 1999). The fact that the Rhine has become much cleaner over the past two decades is more the result of sustained efforts and the high level of information exchange between involved intergovernmental, transnational, and EU agents contending with pollution than the abilities of the International Commission for the Protection of the Rhine Against Pollution (Bernauer & Moser, 1996).

The IJJWC has successfully defused water tensions between Israel and Jordan to the point at which, according to Israel's co-chair, "Mutual trust is so high that we don't use any tricks" (M. Ben-Meir, personal correspondence, August 27, 1998). How well this trust will hold in the era following the February 1999 death of King Hussein remains to be seen. Beset in early 1999 by the worst regional drought in 50 years, Israel declared its

plans to cut delivered water amounts to Jordan stipulated in the 1994 peace treaty by 40%, based on its inability during the 1998-1999 winter to collect 20 million cubic meters of water from the Yarmouk. Jordan has strongly rejected the proposal and has insisted on obtaining its rightful share as stipulated in the peace treaty's water annex (Khatib, 1999).

Notwithstanding its past success, and perhaps because of the urgency necessary to ensure Jordan's water security, the IJJWC's approach has been to focus primarily on technical and engineering solutions. Only infrequently are conservation alternatives that require cooperation beneath the national level attempted. The case of the Bet Shean Valley fish farms is one such example, but even here the Israeli water commissioner had to stipulate that the era of cheap water is at an end and that a change in mentality with regard to water use is not only warranted but necessary (M. Ben-Meir, personal correspondence, August 27, 1998).

THE REGULATORY/STANDARD-DRIVEN PARADIGM

The trend in international environmental quality accords has been to move toward numerical standards and strict regulation of pollution. Environmental nongovernmental organizations (NGOs), convinced of the appropriateness of the regulatory approach to pollution adopted by the United States since the early 1970s, have stressed international harmonization and the stiffening of environmental standards. The lessons learned about uniform national standards that poorly fit local circumstances in the United States seem lost to proponents of the regulatory approach in the international arena. It is undesirable, for example, to permit the air in national parks to be degraded to a national standard acceptable in urban locations; nor should water suppliers be required to test for naturally occurring hazardous chemicals that are demonstrably absent within hundreds of kilometers of the supply source.[11]

11. The argument against uniform levels of air pollution centers on air quality standards set for urban areas, which can result in severe visibility impairments in faraway, relatively pristine national parks. See, for example, Davis and Gay (1993) and White et al. (1994). For water, see Sprouse, Corey, and Varady (1996). For an explanation of how NGOs fill an available niche in international law, thus becoming a permanent player with the capability to influence all phases of regulatory policy, see Tarlock (1992). Perhaps the best example of an emphasis on the goal of regulatory harmonization incorporating centralized decision-making institutions is found within the EU (see Abbott, 1992). For an excellent discussion on harmonization of environmental standards within the international trade arena, as well as a forthright explanation of the benefits of international harmonization for addressing global-scale environmental issues, see Stevens (1994). However, it is important to note that we are not advocating nonuniform standards for all cases. There are those circumstances when disparate standards result in environmental harm: Chlorofluorocarbon emissions, marine mammal and turtle protection, and hazardous waste laws can be markedly different across the North-South divide. Furthermore, contentions between nations over disparate environmental standards may redirect to, or provoke, larger scale disagreements over other bi- or multilateral issues.

Like technical approaches, regulatory approaches (Figure 2) are also prone to misaddressing problems. Perhaps no better example exists than the Colorado River accords between the seven U.S. riparian states and between the United States and Mexico (Fradkin, 1996). Mexico, concerned that the United States was sucking the Colorado River dry, lobbied for a set allocation of river water. The ensuing Treaty of 1944 requires the United States to annually provide 1.5 million acre-feet (1.853 km^3) of Colorado River water to Mexico, a small fraction of what had once flowed south (Utton, 1991). The treaty made no mention of water quality, however, and postirrigation return flow to the river is heavy with dissolved salts. The net effects for Mexico include decimation of the wetlands at the river's delta, severe impairment of the upper gulf of California's ecology, reduced agricultural yields, and salinization of irrigated land in the Mexicali Valley.

Example: The Finnish-Swedish Frontier Rivers Commission

Created under the Boundary Waters Agreement of 1971, the Finnish-Swedish Frontier Rivers Commission (FSFRC) is a joint body that supersedes national judicial and regulatory organs. It has jurisdiction over 75,000 km^2 along the 546-km (340-mile) river-defined border between Finland and Sweden, consisting of the Torneälven river and its tributaries, borderland lakes, and part of the Gulf of Bothnia (Fitzmaurice, 1992). Although we use FSFRC to illustrate regulatory and standard-driven designs, FSFRC also incorporates features of other designs: It favors a strong scientific and technical bias and, for the most part, is top-down and closed.

FSFRC has six members, three each appointed by the two governments. Of the three members from each nation, one must be well versed in law and possess judicial experience; one must be a technician; and the third, appointed on the recommendation of the two northernmost counties in each country (which have large Sami populations), must be well acquainted with borderland conditions. The commission may also employ experts for special investigations.

FSFRC must manage the waters covered by the agreement such that both countries benefit from the frontier watercourses but the interests of border areas must be emphasized. Generally, the FSFRC has both judicial and administrative oversight over all use or development of these waters, including construction-related issues, regulation of water flow and fisheries, and pollution prevention. The 1971 agreement states that nature conservation is particularly important, with the greatest attention to focus on preservation of fish stocks and the prevention of water pollution. Pollution prevention is governed by national legislation concerning public health, nature conservation, and water quality, as well as by the municipal laws of both nations. FSFRC's oversight, therefore, is quite stringent. For example, neither solid nor liquid wastes may be

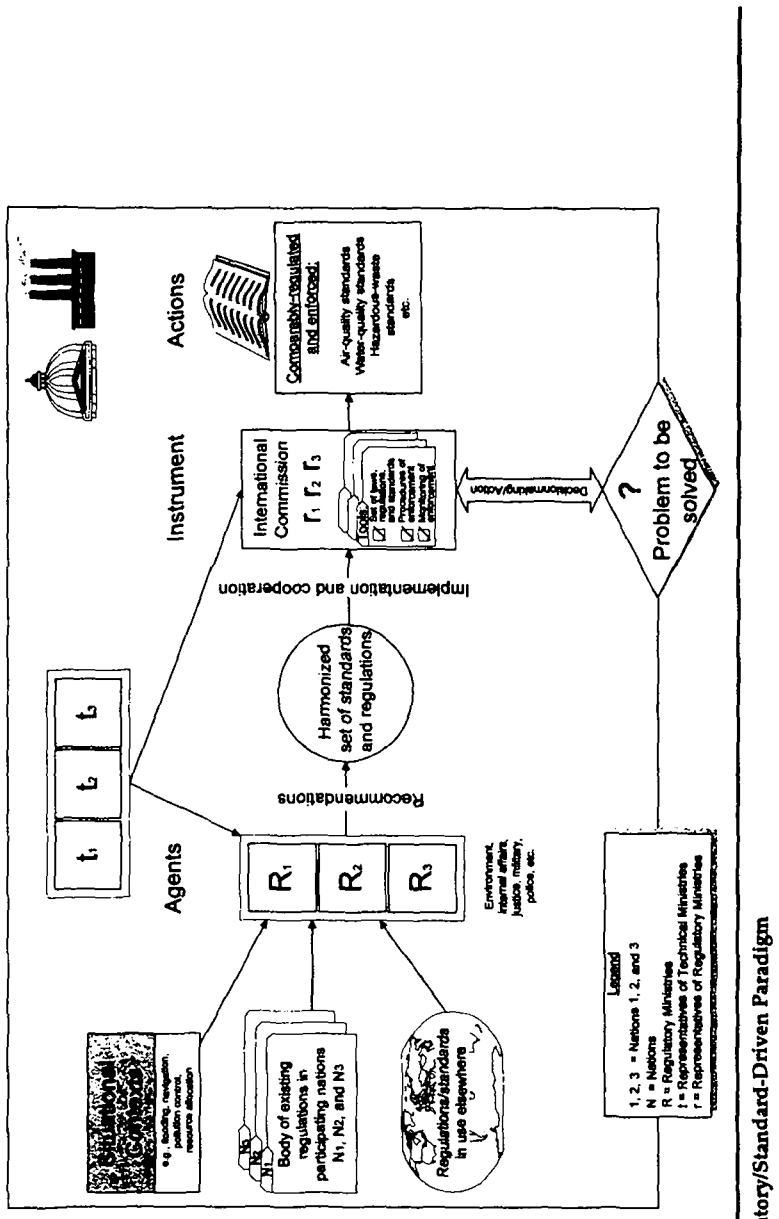

Figure 2: The Regulatory/Standard-Driven Paradigm

discharged if they cause detrimental silting or a decline in water quality, damage fish stocks, reduce aesthetics, impair public health, or otherwise damage private or public interests.

In practice, by far the most important of FSFRC's functions is the granting of permits, for which it has the authority to set the prior conditions that must be met. To protect the public interest, FSFRC may submit any permit application to the two governments. Such a submission always takes place if either government requests it prior to FSFRC reaching a decision, but once FSFRC makes a decision, neither government can intercede. To give teeth to the FSFRC, it and its experts are granted broad powers to enter and examine premises; in case of violations of the permit process or the conditions of a permit, local courts fine or imprison guilty parties.

FSFRC is specifically mandated to balance competing interests. As "reasonably required," polluters must take ameliorative measures, endure restrictions, and observe precautions to prevent or remedy damage. FSFRC reviews permit applications based on the technical feasibility of pollution mitigation and on the public and private interests affected by the proposed project. In balancing interests, FSFRC *must* decide against a permit application if it will negatively affect a particular group of people or the ecosystem.

Among all river basin accords, the Swedish-Finnish agreement may be the most effective, principally because only two countries participate and their environmental regulations have largely been harmonized.[12] FSFRC, with its broad environmental mandate, has been given strong regulatory and enforcement tools. Nonetheless, it is clearly controlled by the numerous technical and regulatory agencies of the two nations. Despite its marked success, the FSFRC may soon be abolished. A 1998 study by Sweden's Ministry of Environment concluded that the commission may have outlived its usefulness, finding that (a) the environmental laws of Sweden and Finland are so closely harmonized that the usefulness of an independent commission is questionable; (b) with regard to environmental protection and salmon fisheries, the FSFRC's legal structure is in part contrary to that of the EU; and (c) individual citizens of any Nordic country may request an environmental impact assessment for any matter that has a transboundary influence. In Sweden's view, local governments are best placed to decide border issues under the EU umbrella, with only loose oversight at the national level. Opinion in the Finnish government concerning FSFRC's abolition remains divided (J. Bodegård, head of the Division of Biodiversity and Nature Conservation, Ministry of the Environment [Stockholm], personal correspondence, June 3, 1998).

12. A long history of Nordic cooperation exists, dating back to 1397 (The Nordic Council, 1999).

Summary

The FSFRC demonstrates that regulatory approaches to shared waters can be successful, but, as Sweden recognizes, they may have outlived their usefulness in an era of increasing decentralization where single, uniform standards are increasingly considered to be obsolete. Furthermore, standards imposed from national capitals often lack enforcement at the local level, whether by design or lack of local capacity, and thereby stimulate a common critique of this paradigm. In the case of FSFRC, lack of enforcement has never been an issue, but it is a locus of contentiousness with the propensity to diminish public support for agreements elsewhere in the world, as was demonstrated by internal debate in the United States prior to the passage of NAFTA.

THE CLOSED (RATHER THAN OPEN) PARADIGM

Traditionally, the process of negotiating international agreements has been restricted to high-level professional diplomats. With regard to global or transnational environmental issues, NGOs have insisted on a meaningful role in framing the debate and generating alternatives since the 1972 Stockholm Conference on the Human Environment. This attempt to democratize official negotiations generally has been resisted by professional diplomats, technocrats, and military officers. These officials, pursuing as they do their own, often parochial, national interests, insist that the necessity for delicacy, secrecy, and professional expertise makes the imposition of actors they consider "amateurs" inappropriate and unwise (Figure 3).

The rhetorical and unswervingly dogmatic positions taken by various countries during the cold war, when secrecy and security concerns were especially prevalent, offer the foremost example of politicization by national interests. The Danube case that follows was especially subject to such considerations because the river basin straddled the now-defunct Iron Curtain.

Example: The Danube Declaration

Connecting eastern with western Europe, the Danube flows 2,850 km (1,780 miles), and its basin includes 17 countries.[13] The Danube serves as an important transportation artery through the region. The river, as well as its 300 major and minor tributaries, is the source of drinking, irrigation, and industrial water supply for 90 million people, and a disposal

13. Germany, Austria, the Czech Republic, the Slovak Republic, Slovenia, Croatia, Bosnia-Herzegovina, the Serb Republic of the Yugoslav Federation, Hungary, Romania, Bulgaria, Moldova, and Ukraine. Poland, Albania, Italy, and Switzerland constitute less than 2% of the catchment area. The Danube is boundary to Slovakia-Hungary, Croatia-Yugoslavia, Yugoslavia-Romania, Romania-Bulgaria, Romania-Moldova, and Romania-Ukraine; it is transboundary to Austria, Hungary, and Yugoslavia. Its source is in Germany.

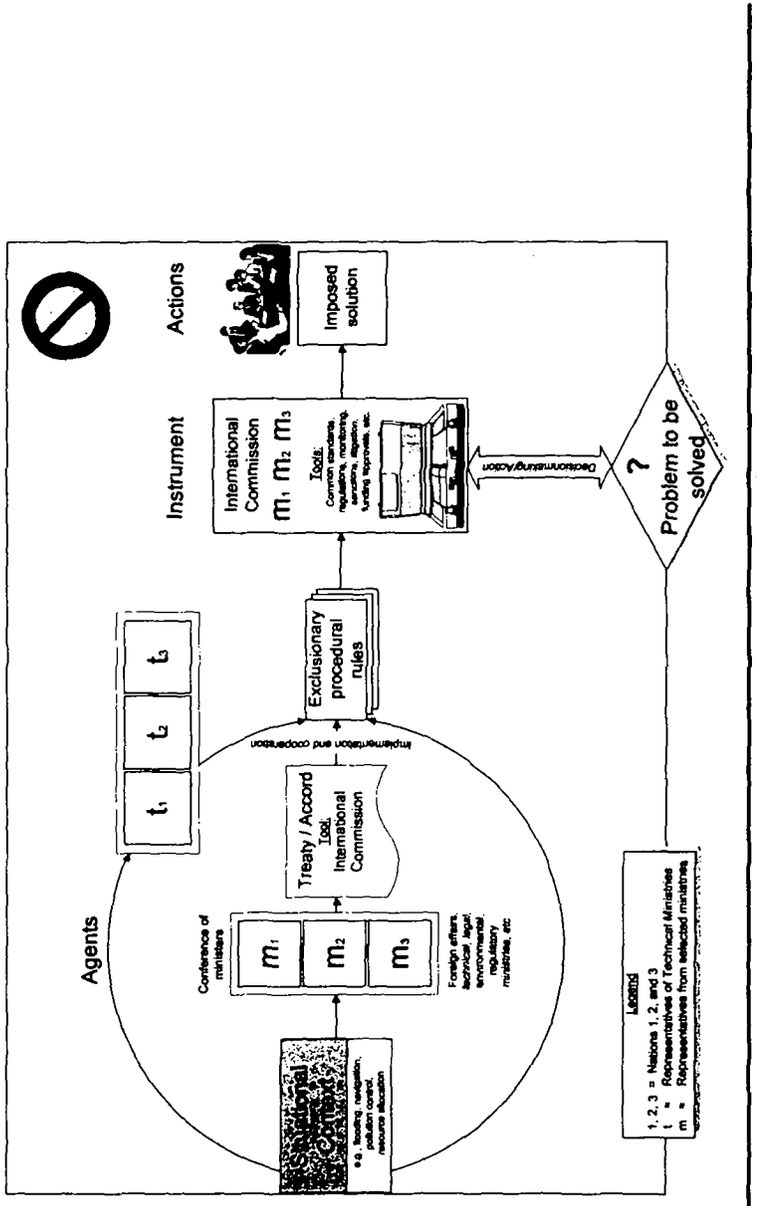

Figure 3: The Closed Paradigm

site for municipal, agricultural, and industrial waste (Central European University, 1998a).

Matching the geographic medley of the Danube is the cultural, political, and economic diversity of the nations it serves. Issues related to development and environmental protection invoke a spectrum of national and local actors, different administrative laws and procedures, varying and sometimes competing national priorities, and widely disparate resources for solutions to problems (Linnerooth, 1990). Countries at the upper reaches of the river (Germany and Austria) contrast sharply with those at the lower reaches (Yugoslavia and Romania) with respect to both degree of industrial development and level of environmental consciousness. The 1991 breakup of the Yugoslav Federation and subsequent Croatian and Bosnian wars have exacerbated this west-east divide. A 1993 mission by the United Nations Industrial Development Organization to Croatia found that the wars caused enormous ecological damage to the Sava and Drava rivers, major tributaries of the Danube. Not only did phosphates, pesticides, sodium hydroxide, fragments of munitions, asbestos, and other chemicals heavily pollute these tributaries, but these pollutants also ultimately threatened Black Sea fisheries and the Danube delta's ecology (Rose, 1993).

Since the 19th century, the principal Danube issues that have provided a foundation for negotiations, treaty making, and institution building concerned navigation and electricity generation. The Congress of Paris in 1856 declared the river to be an international waterway. In 1948, a new navigation accord was signed in Belgrade; the original contracting parties to this Danube Convention were the Soviet Union, Hungary, Romania, the Ukrainian Soviet Socialist Republic, Czechoslovakia, and Yugoslavia. Austria acceded in 1965. West Germany never joined, although it attended the meetings; and unified Germany is set to become a member.[14] The Danube Commission includes one representative from each signatory state and maintains a secretariat from among member states.

14. The Czechoslovak seat quietly passed to Slovakia. But downstream, for several years matters were in turmoil. Following the breakup of the Soviet Union and the Yugoslav Federation, the Croatian bank was controlled by rebel Serbs, and Ukraine pressed for Russia to lose its place. The Russians, claiming a "special interest" in the area, demanded to stay in. Ukraine was equally adamant that Moldova should not have a seat, since the 1975 Final Act of the Conference on Security and Cooperation in Europe froze all European frontiers—including the internal frontiers of the various Soviet republics. The frontiers of the Moldovan Soviet Socialist Republic in 1975 did not include Moldova's current 937 meters of river frontage (Rich, 1993). For an excellent review of the Byzantine politics of the Danube, see Rich (1991). By 1998, these issues had been resolved. On March 26, 1998, Germany, Croatia, and Moldova acceded to the 1948 Belgrade Convention. The status of these nations within the convention will remain unchanged until 8 of the 11 nations (including the 3 new signatories) ratify the new membership. Meanwhile, the once-contentious issues surrounding Russia's membership have quietly been shelved (M. Oreshnikov, Office of the Danube Commission, Budapest, personal correspondence, March 23, 1998).

Subsidiary to maintaining safe navigation, the commission has also engaged in hydrologic services, tackled flood control problems, and sponsored hydroelectric plans. Also, the commission considers questions of sanitation and river inspection, but a narrow reading of the Danube Convention on the part of several governments ties discussion of these issues to the primary interest of navigation. That this is the case is not surprising. Consider that Hungary is especially concerned with Danube pollution, since 96% of its water supply—much of it in need of treatment—originates upstream. Austria is one of the major polluters of water flowing into Hungary. Until 1980, neither Vienna nor Linz had wastewater treatment facilities, prompting Austria to defer discussions of Danube pollution. And, until its breakup in 1991, the Soviet Union's position with regard to international solutions was consistently restricted to coordination of national policies. Effectively, then, the riparian states coordinate with one another within their own reach of the river rather than meeting as a collegial body to consider the problems of the Danube as a unified entity (Stein, 1972). Even so, disagreements abound, as exemplified by the disputed Gabcikovo-Nagymaros Dam on the Hungarian-Slovak border (Land, 1992; Linnerooth, 1990; Rich, 1993).

As early as 1977, the World Health Organization warned of the inadequacy of pollution controls on the Danube. In 1986, prodded by the prospect of rapid economic development in the Danube basin; the dependence on the river of the lower riparian nations for drinking water, irrigation, fisheries, and Black Sea tourism; and powerful environmental movements in West Germany and Austria, representatives from the then-eight countries through which the Danube flowed declared their willingness to cooperate in its management, especially in confronting the mounting problems of water pollution (Linnerooth, 1990).[15] This

15. An overview of the Strategic Action Plan for water quality, a key element of the nascent Convention on Cooperation for the Sustainable Use of the Danube River, as well as a description of the ecological setting of the Danube basin, is in Nachtnebel (1996). Further details on water quality along different sections of the river are in chapter V, sections V.2-V.6 of this report. Also, although previous international agreements for the Danube basin were entirely closed, public and NGO participation was actively solicited throughout the planning process that led to the Danube Declaration—a first for an international body. The 1991 Environmental Programme for the Danube Basin arose from the Danube Declaration and explicitly includes the principle of public participation. However, participation from the public itself, as opposed to the two individuals from each country earmarked as coordinators, remained mere rhetoric until 1993. At the 1993 Bratislava meeting, the task force set up under the Danube Declaration (which includes 11 Danube basin riparians, such nonriparians as the United States and the Netherlands, various multilateral donor banks, two UN agencies, three environmental NGOs, and a private philanthropic foundation) prepared a strategic action plan (SAP) that, for the first time, noted that it is "desirable" to have real public participation, in particular with parties who would be responsible for the plan's implementation. Further evolution toward an open, rather than a closed, paradigm came to pass in January 1994 when the SAP drafting group held its first meeting, agreeing that the SAP should be made a tool supporting the then-proposed Convention on Cooperation for the Protection and Sustainable Use of the River Danube,

nonbinding Danube Declaration (also known as the Bucharest Declaration) is the first step toward an ecosystem-based approach to Danube basin management.[16]

However, the Danube Declaration agreement follows the Danube Commission model, for it states that "the governments of the Danube states will endeavor to solve, stepwise, through bilateral and multilateral agreements, the concrete problems of the Danube." The wording clearly reveals the expectation that counterpollution measures will narrowly focus on *two*, or perhaps a cluster, of countries rather than being integrated and comprehensive agreements. No doubt the disparity of control over the river contributes to the level of difficulty in achieving bilateral, let alone multilateral, agreements. For example, in Austria domestic authority and international authority over the Danube are spread among six government ministries, but responsibility for all feeder rivers rests with provincial authorities. In Hungary, almost all aspects of control over the river are exercised by one central body, the National Water Authority. In Germany and Slovakia, state governments have primary responsibility for all rivers within their territories.

Compounding the difficulties imposed by politics, it is noteworthy that there exists neither a single definition of "water quality" nor a common agreement on how water quality should be tested. The absence of an authoritative scientific body with jurisdiction over the entire basin is only partly filled by the International Association for Danube Research, itself a part of the International Society for Limnology. This association investigates the physical, chemical, and biological properties of the Danube but does not engage in any policy-related research, nor does it offer advice on which properties of the river should have priority in the decision-making process.

Example: The Plan of Action for the Zambezi

Five nations share the Zambezi's main stem, while three others are part of the Zambezi basin.[17] Initiatives by the United Nations Environment

designed to achieve sustainable and equitable water management in the basin. Also known as the Danube River Protection Convention, this new convention was ratified by the riparian states in June 1994. However, the public at large remains excluded from the process. Instead, the consultation meetings as proposed are to consist of representatives from nine government ministries, mayors, managers of public utilities, private sector consultants involved in basin studies, managers of research institutions, and Danube-focused NGO representatives and journalists. Further details may be found in Bingham, Wolf, and Wohlgenant (1994).

16. A NATO-funded project at Budapest's Central European University allows interactive on-line searches of water quality parameters for nine Danube basin nations (Central European University, 1998b).

17. The Zambezi rises in Zambia, then becomes transboundary as it loops through Angola and back into Zambia; it is boundary to Zambia-Namibia and Zambia-Zimbabwe before once more becoming transboundary to Mozambique. Tributaries rise in Tanzania, Botswana, and Malawi. The main stem of the river flows 2,740 km (1,700 miles).

Programme to encourage states to agree to an integrated approach for the development of river basin resources resulted in the adoption of an Agreement on the Action Plan for the Environmentally Sound Management of the Common Zambezi River System in 1987. In 1991, a convention was proposed by the Southern African Development Coordination Conference (now the Southern African Development Community [SADC]), which suggested coordination of policy with regard to navigational, agricultural, economic, and industrial uses of the Zambezi River basin, including the exploitation of its fauna and flora. The basin states are to cooperate in the study and implementation of any project likely to have an impact on navigability, agricultural and industrial exploitability, water quality, and biological characteristics of the Zambezi and its tributaries. The signatory parties will accept a general obligation to maintain a proper balance between environmental protection and development, and will develop protocols to prevent, reduce, and control pollution from all sources. The Plan of Action for the Zambezi (ZACPLAN) was born in May 1995 as an offspring of SADC's Protocol on Shared Watercourse Systems[18] and involves 11 countries, including the nonbasin states of Lesotho, South Africa, and Swaziland.

ZACPLAN's functions are astonishingly broad, with mandates in 36 sectors: It is to coordinate cooperation among the signatory states to ensure the integrated development of the Zambezi's resources, particularly its potential in energy, water resources, agriculture, animal husbandry, fisheries, forestry, transport, and industry. It is also expected to prevent and control drought and desertification, as well as soil erosion and sedimentation. ZACPLAN is intended to harmonize national development policies through the implementation of integrated development projects, with the ultimate goal being the formulation of a master development plan. Its proposed mandate extends to groundwater resources in the basin, and it will have data-gathering and dissemination responsibilities. Its jurisdiction will extend to regulating and controlling navigation; improving and maintaining navigable waterways; preventing and reducing water pollution; developing food crop, fishery, and forestry resources; and applying for financial and technical assistance.

ZACPLAN's implementing agency is the Zambezi River Basin Commission (ZRBC). ZRBC, as conceived, is to consist of the respective heads of state (meeting biannually to set policy), a council of ministers (meeting annually to monitor the executive directorate and coordinating unit), an executive directorate responsible for day-to-day operations, and a coordinating unit. The operating budget for the convention and the ZRBC, formerly specified to be equally shared among the signatory

18. For the protocol's text, see the Southern African Development Community's SADC-USA site at http://www.sadc-usa.net/reference/protocol/h2oprot.html.

states, now "are to be a specific part of the [SADC shared watercourses] protocol" (Maluwa, 1992; Tawfik, 1996).

As of this writing, SADC's members are considering ratification of the protocol on shared watercourse systems. ZRBC, together with several subcommittees, is under the regional water sector coordination unit in SADC. Each SADC member state is responsible for a priority area. However, only 2 or 3 of the 36 sectors are being addressed. Most elements of ZACPLAN are not yet in place, and the ZRBC lacks funding and full institutional articulation with SADC (W. Rast, director, water, United Nations Environment Programme, Nairobi, and H. Drammeh, assistant to W. Rast, personal correspondence, April 14, 1998).

Summary

The Danube and Zambezi examples highlight a distinguishing feature of the closed paradigm—exclusion of public participation in any form and, in the extreme, the exclusion of interested government-level parties. The former Soviet Union's exclusion of the former West Germany from the Danube Commission represents such an extreme case. The Danube Commission vividly shows the cumbersomeness and ultimate truncated functionality of this paradigm. If relevant ministries, provincial authorities, and local input had been included in the commission, some of the problems currently and simplistically ascribed to animosities between different parties might have been—at least partially—alleviated. The apparent inviolability of the historical European notion of bilateral and multilateral agreements made behind closed doors remains paramount. Until a basinwide climate of openness and cooperation over water resources and water quality is fostered, management of the Danube will continue to be a contentious issue, with the river basin's only protection being nonbinding resolutions.

Even more than the Danube Commission, the fledgling ZRBC operating in the Zambezi basin is an example of a quintessentially closed design. The committee's policies are set by attendees of biannual meetings of heads of state. The design of this commission underscores the fact that such closed and potentially unresponsive designs are being created even in the 1990s.

THE TOP-DOWN PARADIGM

According to international law and diplomacy, ratified international agreements supersede domestic laws and arrangements. These international conventions consider nations to be unitary actors—whether or not the parties involved have strong federal systems. Consequently, and with the United States as an example, international agreements often reflect the viewpoint of just a few federal agencies. Even so, the U.S. State Department's stance frequently dominates the agenda, and the interests

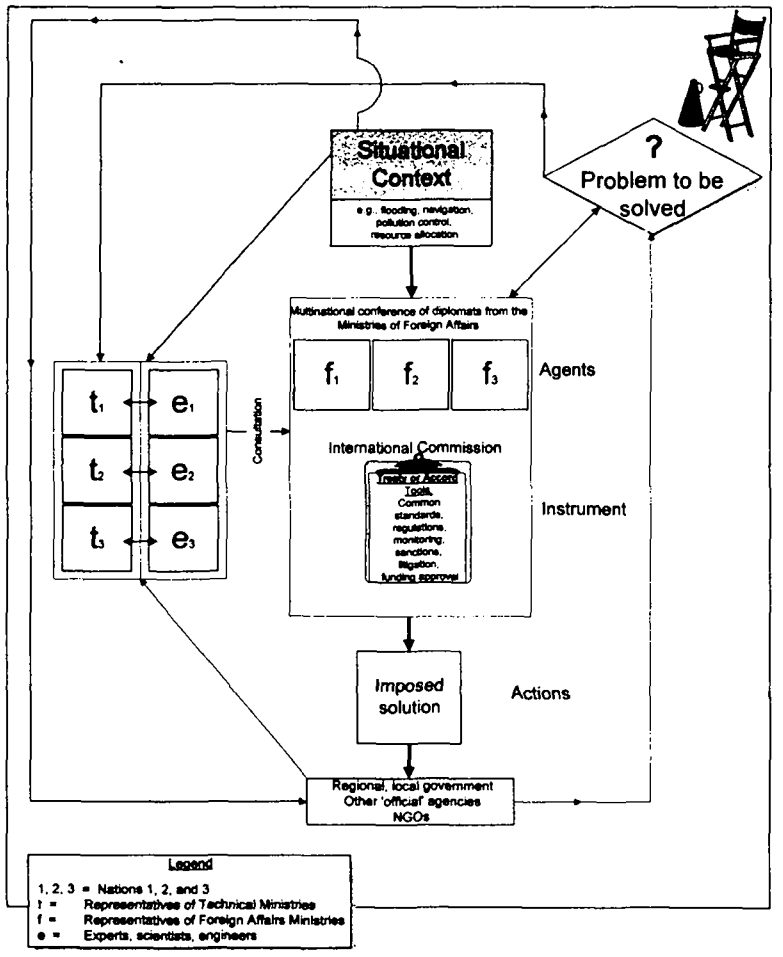

Figure 4: The Top-Down Paradigm

of state and local governments, as well as of NGO actors, tend to be downplayed or ignored. It is therefore not surprising that implementation structures are seriously flawed: Agents lack the capacity and motivation to be effective, and targets are frequently poorly chosen, unwilling, or unable to perform as anticipated. Local informal arrangements that might have become the basis of formal cooperation are largely ignored.

Top-down decisions (Figure 4) made in national capitals rarely account for the needs, desires, and aspirations of the borderlands' inhabitants (Ingram, Milich, & Varady, 1994). Illustrative of this dissociation

between national political goals and local needs is the issue of nuclear safety in the western European Limburg region. Prompted by the 1986 Chernobyl disaster in the former Soviet Union, top-down agreements on transboundary emergency planning were made between Belgium, the Netherlands, and Germany, since there are 18 operational nuclear reactors within a 165-km radius (the area initially evacuated following Chernobyl's containment failure) of the center of Limburg. Harle (1990) noted that "the national borders dissecting the [region] make a nonsense of evacuation plans.... Evacuation of the population at risk would be a virtually impossible task, even if such procedures were started on time" (p. 186). The likelihood of such procedures actually being timely was certainly hampered. As Harle explained, were an accident to occur in a Belgian reactor 40 km from the Dutch frontier, the operators would call Liège provincial authorities, who in turn would contact the Ministry of Internal Affairs in Brussels, who would presumably (for this was not obligatory) alert the Belgian Foreign Ministry, which would finally contact its counterparts in The Hague. And so, by way of a "detour" of 400 km, the provincial authorities of Dutch Limburg would eventually get the message and start evacuation procedures.

Example: The Río del Plata Treaty

Five South American nations (Argentina, Bolivia, Brazil, Paraguay, and Uruguay) share the Plata basin, the rivers of which are both boundary and transboundary.[19] The 1969 Plata Basin Treaty established a coordinating committee and provided the first framework for integrated development between the basin nations. However, centuries of mutual distrust have made implementation of international agreements in this part of the world difficult (Trevin & Day, 1990).

The treaty is an agreement to cooperate in a number of areas rather than a point-by-point directive. Such an agreement indicates that the five nations were unwilling to undertake more substantive obligations, instead confining themselves to an institutional coordination mechanism through which a framework for facilitating conflict resolution could be built. For instance, Article I of the treaty identifies its objectives: the joining of forces to promote the harmonious development and physical integration of the Plata basin. To that end, the contracting parties pledged to identify areas of mutual interest and to establish studies, plans, engineering works, operating arrangements, and legal instruments so as to achieve an impressive list of objectives: aiding of

19. Río Paraná and Río Paraguay both form boundaries between Paraguay-Brazil and Paraguay-Argentina; the Paraguay also defines part of the Brazil-Bolivia border. Río Pilcomayo forms the border between Paraguay-Argentina, and Río Uruguay defines the frontiers between Argentina-Brazil and Argentina-Uruguay. The Paraná flows from Brazil to Argentina, as does the Paraguay via the nation of Paraguay. The source of the Pilcomayo is in the Bolivian Andes.

navigation, rational use of water resources, conservation and development of animal and plant life, improvement of infrastructure and communications, regionwide industrial planning, "economic complementarity," development of natural resources, and acquisition of comprehensive knowledge of the basin. On the other hand, Article V restrains projects undertaken wholly within national territories only to the extent of "respect for international law and fair practice among neighboring friendly nations."

The system established under the treaty includes an annual meeting of foreign affairs ministers (FAM), which sets policies and guides action. A permanent intergovernmental coordinating committee (ICC) with representatives from all five nations maintains a secretariat that coordinates, promotes, and controls multinational efforts. FAM and ICC decisions both require unanimity. The treaty also set up a financial institution (FONPLATA) to finance programs consistent with its objectives.

Example: The Niger Basin Authority

The 1964 Niger River Commission originated during the first flush of postindependence amity among newly created West African states. Signatory states viewed the commission as an expression of mutual solidarity, binding Francophone and Anglophone nations. The commission's objectives were to collect and analyze basic data. Reorganized in 1980 as the nine-member Niger Basin Authority,[20] its mandate now extends to ensuring the integrated development of the basin and initiating and monitoring an orderly and rational regional policy for both surface water and groundwater within the basin (Tawfik, 1996).[21] However, the authority has been unable to formulate a coherent master plan: National governments may voice support for regional plans, but their actions remain purely domestic (Gould & Zobrist, 1989).

In a 1995 interview with the executive secretary of the Niger Basin Authority (O. Mustapha, personal correspondence, September 15, 1995), we learned that little had been achieved beyond the stockpiling of reports and action plans. Furthermore, signatories were disagreeing over the requirement that financial contributions to the authority be equal—Chad, with just 100,000 people living in the basin, believes its dues should be less than Nigeria's, which has more than 60 million basin inhabitants. As a result, when economic difficulties followed the 1994 devaluation of Francophone West Africa's common currency at the

20. Guinea, Côte d'Ivoire, Mali, Niger, Burkina Faso, Benin, Nigeria, Cameroon, and Chad. Both the main stem of the river and its principal tributaries are transboundary waterways. The Niger rises in Guinea just 320 km (200 miles) from the Atlantic Ocean but flows northeastward into the heart of West Africa before turning southeast to empty into the Atlantic 4,180 km (2,595 miles) later.

21. Herein, the discussion of the Niger Basin Authority corroborates our assertion of its economic disorganization.

same time that massive inflation plagued Nigeria, members ceased to fund the authority. At the time of writing, the United Nations Environment Programme is attempting to resurrect the authority from its state of paralysis.

Summary

The Plata Basin Treaty uses a classic top-down diplomatic approach to manage its basin and incorporates diverse types of instruments and tools to achieve its aims. Nevertheless, the treaty remains institutionally weak, for its capacity to regulate or enforce its decisions is poor. This weakness may be deliberate on the part of the signatories, for theirs is a history of mistrust. In cases like these, where there is such a tradition of hostility and even warfare, top-down designs tend to replicate and even fortify existing suspicions and misgivings. Resultant institutions become extensions of diplomatic mechanisms that failed to halt previous conflicts in other arenas. Because of the top-down emphasis, there is no obvious role for either public or local government participation.

The Niger Basin Authority too has been hostage to political rhetoric, and thus its undertaking of concrete action has been incapacitated. Only recently has the United Nations Environment Programme spurred member states to lay firm plans that will strengthen the authority's institutional capacity, which may also ultimately redress the authority's long-standing deficits in financial and infrastructural resources. But it remains unclear whether such plans will be able to either accommodate imbalances in size and power among member states or advance regional cooperation when the occasional acute conflict breaks out.[22]

CONCLUSIONS

To differing degrees, most if not all existing international river basin accords exhibit the inherent disadvantages of the above four paradigms. In some instances, the dominant or prevailing paradigm is easy to discern; in others, distinctions blur and characteristics blend. From our analysis of the accords emerge five common themes, which we reinforce with evidence from elsewhere in the world.

1. Power is parsimoniously distributed away from the center. As emphasized by the above examples, accords are nation to nation even when river systems are international and even when facing riverbanks have more commerce, more common culture, and stronger regional ties with each other than with their respective nation's cores. Policy decisions made in national capitals rarely consider the needs, desires, and aspirations of the borderlands' inhabitants.
2. The power structure of these organizations often reflects political and economic imbalances between the participating members. As a result, "agreements to agree" can become stymied by a refusal to play the game. In the case of the Danube Commission, for example, the former Soviet Union exercised its influence and its doctrinaire position over the West Berlin enclave by refusing to allow West Germany to become a full member (M. Oreshnikov, Office of the Danube Commission, Budapest, personal correspondence, September 3, 1994). Brazil, to some great extent, wields similar disproportionate dominance among the states of the Plata Basin Treaty (W. Rast, personal correspondence, April 13, 1998). The International Boundary and Water Commission (IBWC), operating between the United States and Mexico, probably best exemplifies a power imbalance between an accord's participating countries. Until very recently, the IBWC was as much a source of contention and discord between the two countries as it was an instrument for managing a common resource (Ingram & White, 1993; Mumme, 1986).
3. Implementation of accords is generally left to the discretion of signatory parties rather than being unequivocally programmed into an agreement. IBWC Minute 242 between the United States and Mexico reducing salinity in Colorado River water delivered to Mexico, offers a rare example of unequivocal programming. Over several decades early in this century, Mexican agriculture was harmed by excessively saline Colorado River water, delivered at concentrations around 1,200 parts per million (ppm). To live up to the letter of an agreement to deliver water to Mexico that is of a quality no worse than water delivered to California's Imperial Valley, the United States constructed the $258 million Yuma Desalting Plant. Operations began in May 1992, reducing salt concentrations to 800 ppm—a salt concentration twice as much as it was at the beginning of the century—at an annual cost to the United States of an estimated $25 million.[23] Such binding stipulations contrast starkly with exhortation, often the only tool available to an overseeing commission responsible for coordinating designated accord activities.
4. At both national and subnational levels, mechanisms rarely exist for public participation in the decision-making processes that result in the

22. Examples include the current sporadic exchanges of gunfire between Nigeria and Cameroon, the 1974 border war between Mali and Burkina Faso, and Nigeria's long-simmering ethnic rivalries, a situation that precipitated the Nigerian civil war of 1967-1970. See Adeniji (1997), Baker and Ausink (1996), and Onstad (1998).

23. An account of IBWC Minute 242 and the subsequent construction of the Yuma Desalting Plant is in Pontius (1997). See also Fradkin (1996) and Varady, Ingram, & Milich (1995). More information on the history and technology associated with the Yuma Desalting Plant may be found at U.S. Bureau of Reclamation's Yuma Area Office site at http://www.yao.lc.usbr.gov/ydp5.htm. Idle following high precipitation amounts in 1993, following which Colorado River salinity reached acceptable levels, the plant will be restarted once needed. If operations were to resume, environmentalists fear for the health of Mexico's Cienega de Santa Clara, the largest of the remaining vestiges of wildlife habitat in the Colorado River delta and part of the core area of the Upper Gulf of California-Colorado River Delta Biosphere Reserve. For a summary of this issue, see Water Resources Research Center (1992). A compilation of the various statutes, minutes, international treaties, and interstate compacts governing the Colorado River, known collectively as the "Law of the River," can be found in U.S. Bureau of Reclamation (1996).

creation or implementation of river basin accords. Only recently have large public groups become sufficiently aroused to attempt intervention in transboundary natural resource decision-making processes.[24] Few transnational environmental accords accommodate, let alone encourage, formal participation by NGOs, community-based organizations, or other spokespersons for public interests. Exclusion of local actors may result in internal political friction and enforcement difficulties.

5. Several of the accords are driven solely by "development" or navigation needs. The resulting commissions are often staffed by engineers and technocrats, both of whom are prone to underestimate the social costs of their schemes. Around the world, technocrats have implemented engineering solutions that undervalue sociocultural, economic, and public health consequences.[25] One of the best known examples is the Aswan High Dam, which both eliminated Nile floods and nearly obliterated the flood-borne transport of the silt that has fertilized Egypt for millennia. Farmlands downriver have become far less fertile, systematically impoverishing farming families who cannot afford inorganic fertilizers. Also, sand encroachment from the Sahara is beginning to cover fields in some places in the Nile Valley; under the former flood regime, silt would be mixed with this encroaching sand, resulting in fertile agricultural lands once the waters receded. The dam's reservoir, Lake Nasser, has also had locally detrimental effects, the still waters at its periphery providing an ideal breeding locale for insect and mollusk disease vectors. Finally, it may be the case that regional winter precipitation patterns have been altered by the reduced discharge of the Nile into the Mediterranean, with Lebanon, Syria, and northern Israel adversely affected (Nachmani, 1997).

Control and management of transboundary resources vested in these five common themes has dominated for nearly 150 years. Today, however, national hegemony may be quietly giving way to multiple interests. In the new era of instantaneous global communication and information exchange, decisions made in distant capitals may seem capricious, arbitrary, and irrelevant to inhabitants of border regions. Yet, abandoning common intra- and international interests in favor of local control of natural resources and the environment may result in the dominance of parochial interests that have no regard for sustainability concerns.

A new model is needed, one that judiciously combines local needs with general concepts of multinational environmental security. The first

24. One such example is the large demonstration held in early 1998 in Budapest against the completion of Hungary's part in new Hungarian-Slovak projects on the Danube River, planned as part of settling the two countries' long-lasting dispute over the Gabcikovo-Nagymaros hydroelectric project (The Danube Circle, 1998).

25. In 1975, 62 dams failed during torrential rains in China. Carefully concealed by Chinese authorities, the catastrophe is now believed to have taken a minimum of 86,000 lives, and affected 10 to 12 million people in the ensuing famines and epidemics. The largest dam was breached largely because silt had blocked sluice gates designed to be opened during flood events (Tuxill, 1996).

significant attempt at achieving such a union has been in effect since 1994 along the U.S.-Mexico border. In the remainder of this article, we discuss how the design of the (U.S.-Mexico) BECC differs from the paradigms governing existing international river basin accord. The BECC may prove to be a superior model for international cooperation, one that is locally focused and inclusive. We begin by explaining why this particular border region is unique yet representative of other transnational areas.

The U.S.-Mexico Border Region: An Overview

The 3,140-km border between the United States and Mexico resembles other boundaries and yet is interestingly singular. In its final form a consequence of the Mexican-American War (1846-1848) and the United States' subsequent Gadsden Purchase of southern Arizona and southern New Mexico from Mexico in 1853,[26] the border separates two nations with distinct cultures and histories (as do most political borders). This boundary has served at various times as an outpost of nationalism, a barrier, a filter, and a set of points of conflict. But, perhaps most notably, it has also been a line of contact and cooperation.

In both countries, national agendas were often, and often continue to be, at variance with the local needs of distant border residents. One longtime observer of the United States and Mexico has depicted the entire period of relations between the two nations as "fragile," primarily characterized by alienation, mutual depredation, structural asymmetries, linguistic and sociocultural differences, and the presence of multiple opportunities for the ignition of misunderstandings or conflicts (Williams, 1992). This may be true of the relationship between Washington, DC and Mexico City, but in the border zone itself, harsh frontier life commonly has fostered acts of cooperation rather than antagonism (see Ingram, Laney, & Gillilan, 1995; Ingram et al., 1994).

With shared physiographic features and ecosystems, long-standing and overlapping kinship and cultural ties, historically interreliant economic systems, and rising urbanization, the U.S.-Mexico border typifies many international boundaries. But these commonalities should not

26. The Treaty of Guadalupe Hidalgo (1848) defined the United States-Mexico boundary; for the relevant text, see California State University's Monterey Bay Local History site at http://www.monterey.edu/other-sites/history/treaty.html. A map of the territory Mexico lost to the United States after 1848 but before the boundary definition established by the Treaty of Mesillas (Gadsden Purchase) can be viewed at the University of Illinois at Urbana-Champaign's Department of History site at http://www.history.uiuc.edu/Collecta/Radding/Radding22.html. The text of the Treaty of Mesillas is available at Yale Law School's Avalon Project site at http://www.yale.edu/lawweb/avalon/diplomacy/mx1853.htm.

mask the important dichotomy that marks the U.S.-Mexican frontier: The United States is a wealthy nation, whereas Mexico is not. Disparities in both the relative strength of the economic systems and the degree of enforcement of environmental laws have attracted a variety of businesses to the border.[27] Banks and department stores catering to Mexicans line the main streets of U.S. border settlements, whereas in Mexico industrial plants called *maquiladoras* have arisen to take advantage of available low-wage labor, accessibility to U.S. markets, inexpensive energy and water resources (Mumme, 1992; Tolan, 1990), and unevenly enforced environmental laws.[28]

In an era when borders and border problems are multiplying,[29] disputes over transboundary natural resources are vulnerable to escalation. Of all natural resource and environmental problems between the United States and Mexico, water has been the most troublesome. Most of the boundary between the two countries passes through regions of water scarcity, which has resulted in intense competition over the water resources of two major rivers, the Rio Grande (Río Bravo in Mexico) and the Colorado (Sánchez, 1997). Often overlooked for the good example it provides, the U.S.-Mexico border offers an instructive archetype of cooperation: Despite asymmetrical power relationships and economic and cultural disparities, since 1848 the two nations have resolved most of their differences peacefully and amicably.

NAFTA Delivers a Paradigm Shift

In North America prior to 1994, binational community problems were addressed in typical top-down fashion, routed through national capitals thousands of kilometers away. But by late 1993, when the United States, Mexico, and Canada signed NAFTA,[30] environmental NGOs in the United States had operated effectively and influentially for more than two decades. Local chapters of national groups such as the Environmental Defense Fund, National Wildlife Federation, Natural Resources Defense Council, and the Sierra Club had begun to play instrumental roles in helping shape local and regional policies. Simultaneously,

27. A general description of asymmetries across the U.S.-Mexico border is in Ganster (1997).

28. For a critique of Mexican environmental policy up to the early 1990s, see Stern (1993). An account of Mexico's attempts during the Salinas administration to strengthen its environmental regulations and their enforcement is in Griffith (1993). For a review of contemporary Mexican environmental policy, as well as its history since its 1972 inception, see Mumme (1998).

29. Since 1991, the number of international boundaries has increased by 49.

30. NAFTA's full text can be found in Trade Compass' Electronic Compliance System site at http://uls.tradecompass.com/ecs/demo/ftas/nafta/trtytxt/index.html.

independent, grassroots, community-based NGOs emerged and began to exert influence. A key tenet for most of these groups was their insistence on greater public participation and less reliance on "command-and-control" management strategies. Although the effectiveness of comparable groups in Mexico was less palpable, NGOs were able to convince the participating NAFTA governments to address environmental issues as part of the trade-pact negotiation process (Liverman, Varady, Chávez, & Sánchez, in press).

NAFTA thus represented a fundamental change in environmental relations for the signatory nations: As part of the NAFTA process, environmentalists argued for and secured two important sets of agreements addressing environmental concerns.[31] For the first time anywhere, auxiliary instruments of a negotiated trade agreement linked environmental sustainability to economic development both across the entire North American continent[32] and in the U.S.-Mexico border zone.[33] This linkage had been encouraged by the 1992 United Nations Conference on Environment and Development and at the time was an unprecedented concept.[34]

Joining environmental and economic agendas yielded a number of useful insights. Policy makers recognized that further development of the border economy requires sizable investment in environmental infrastructure (such as water delivery systems and wastewater treatment plants) to ensure a clean, safe, and healthy environment for residents. As part of the NAFTA negotiations, the United States and Mexico

31. The first of these was the trinational (Canada, United States, Mexico) Environmental Side Agreements (ESA). The ESA can be read at the Secretariat of the Commission for Environmental Cooperation's Web site at http://www.cec.org/english/resources/agreement/index.cfm?format=2. Signed in October 1993, the second agreement is binational and addresses only the U.S.-Mexico border region (see BECC, 1999). An account of the negotiations leading to the trinational ESA, especially the weakening of early U.S. bids to apply trade sanctions if national environmental laws were not enforced in Mexico or Canada, can be found in Winham (1994). The relationship of NAFTA to sustainable development is well researched by Canada's International Institute for Sustainable Development; its Web site is at http://iisd1.iisd.ca/trade/nafta/htm. The University of California, Los Angeles' North American Integration and Development Center tracks NAFTA-related issues; its Web site is at http://naid.sppsr.ucla.edu. NADB's Web site is at http://www. nadbank.org/.

32. The initial work program of the trinational North American Commission for Environmental Cooperation, as well as the explicit provisions provided for transparency and public participation, is documented and analyzed in Spalding (1995).

33. The shortcomings of the North American Commission for Environmental Cooperation to contend specifically with U.S.-Mexico border concerns are explained in Mumme and Duncan (1996). The effort to link environment with trade is documented in Mumme (1993).

34. Following the 1994 Marrakesh meeting of trade ministers to approve the Uruguay Round negotiations, the linkage between trade and environment has been explicitly recognized. For more on globalization of trade and the environment, see the World Trade Organization's Web site at http://www.wto.org/wto/environ/environm.htm.

established two binational organizations that function solely within their respective border regions, a 200-km-wide strip with 100 km on either side of the boundary. One of the two, the North American Development Bank (NADB), helps arrange public-private loan programs to fund environmental infrastructure "certified" by the second of these binational organizations, the BECC.

The BECC has full responsibility for certifying proposed projects.[35] To be eligible for BECC certification, proposed projects must (a) observe all applicable environmental laws and (b) satisfy explicit BECC criteria with regard to community participation, public health and environment, technical feasibility, sustainable development, and continual economic self-sufficiency.[36] A BECC decision not to certify a proposed project prevents it from progressing beyond a design phase. Figure 5 illustrates the process whereby environmental infrastructure projects in the U.S.-Mexico border region are developed, submitted, considered, and certified by the BECC, thereby becoming eligible for eventual financing by the NADB. The figure also indicates points at which external inputs of various sorts result in the BECC being an organization that stands in sharp contrast to existing river basin authorities, as we elaborate below.

The BECC's structure departs significantly from that of institutions formed under previous international accords in that it explicitly avoids the prevailing characteristics of the four dominant paradigms outlined above. This is not to say that elements of these paradigms have never surfaced during the course of the commission's operation, but the built-in openness to public participation has, to date, helped fend off and at times reverse autocratic and technocratic "solutions." Notably, recognizing that additional government regulation would be unlikely to benefit the environment, the BECC-NADB model avoids regulatory provisions. We proceed to show how the BECC further differs from other international accords' paradigms and then briefly reflect on how the BECC could become a model for transnational river basin accords.

REJECTING SCIENTIFIC/TECHNICAL DOMINANCE: INJECTING NONTECHNICAL PERSPECTIVES

Along the U.S.-Mexico border, the IBWC and its Mexican counterpart, the Comisión Internacional de Limites y Agua (CILA), continue to have authority over water allocation (including water releases on the

35. The roles of NADB, BECC, and CEC are further discussed in Ingram, Varady, and Milich (1994-1995). BECC guidelines for project submission and criteria for project certification are available on-line from the Environmental Protection Agency at http://www.epa.gov/docs/fedrgstr/EPA-GENERAL/1995/September/Day-21/pr-595.

36. The criteria are comprehensively listed in Varady, Colnic, Merideth, & Sprouse (1996).

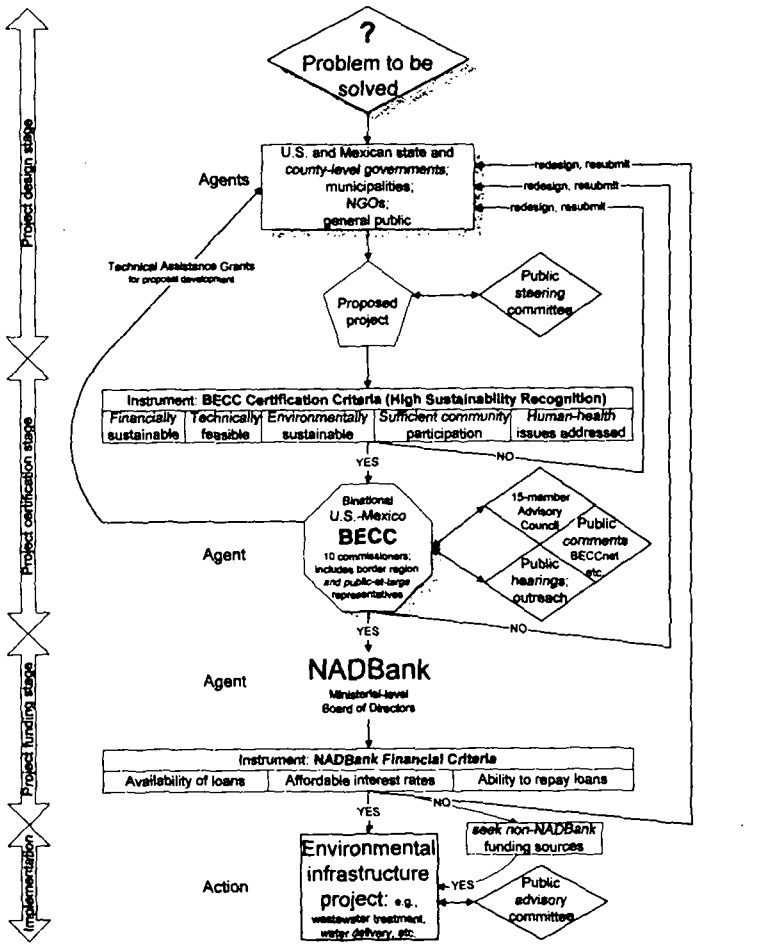

Figure 5: The BECC–NADB Liaison for Proposed Environmental Infrastructure on the U.S.-Mexico Border

Colorado and Río Grande/Río Bravo to meet treaty obligations) and sanitation.[37] According to its charter, the IBWC/CILA must be headed by

37. IBWC/CILA are, in fact, two different sections within the same organization. CILA is a completely independent and parallel entity that is a part of Mexico's Secretaría de Relaciones Exteriores. Analogously, IBWC is within the U.S. Department of State. Each organization has a commissioner, and the commissioners meet jointly, but each commissioner clearly represents his/her home country. Ingram et al. (1995) contains a history of the IBWC and describes how the commission until recently has incorporated elements of all the dominant paradigms. The organizational structure of the IBWC is portrayed in Mumme and Moore (1997). An overview of border water resources and a history of U.S.-Mexico transboundary water management is in Gunning (1996). The IBWC Web site (U.S. section) is at http://www.ibwc.state.gov.

two certified engineers, one from each country, each of whom reports to the respective federal government's foreign affairs branch. IBWC/CILA decisions are made from technical studies: Sizable teams of civil engineers, hydrologists, chemists, sanitary engineers, and other professionals collect data, then design and execute solutions. Understandably, the outcomes of this process are nearly always engineering works such as dams, aqueducts, wells, wastewater treatment plants, and sewer systems.

By contrast, the BECC is governed by a binational 10-member board of directors. Among the 10 are the two IBWC/CILA national commissioners, who bring their considerable technical expertise to the board and inject a scientific-technical-engineering viewpoint. However, such an engineering perspective is complemented, and often counterbalanced, by the viewpoints of environmental agencies, NGOs, affected state governments, and academic institutions.[38] Indeed, the board's majority nontechnical perspectives are unlikely to favor traditionally designed large-scale engineering works because of their associated social and environmental costs. Rather, the BECC favors methods by which it can discharge its mandate to work with affected states, local communities, and NGOs in developing effective solutions to environmental problems in the border region.

When it first met in 1995, the BECC's board promised not simply to rubber-stamp pending projects designed during the IBWC era but to begin afresh to consider all social, environmental, and economic impacts. In the 4 years since, the board has by and large fulfilled this pledge, certifying (as of December 1998) 26 projects adhering to the commission's certification criteria. Although the projects thus far approved all require building and engineering—they are after all improvements in infrastructure—their plans comply with the BECC's environmental sustainability requirements and were drawn up with demonstrable degrees of public input and support.

REJECTING THE TOP-DOWN PARADIGM: BOTTOM-UP DESIGN ENSURES COMMUNITY FOCUS

To avoid the pitfall of centralization, the BECC's board of directors is weighted in favor of nonfederal representatives. Furthermore, the BECC spurs, assists technically, and then awaits requests from localities; in keeping with its adopted policies, the commission gives preference to economically disadvantaged communities.

38. As of August 1998, other members include the administrator of the U.S. Environmental Protection Agency and Mexico's counterpart, the Secretary of Environment, Natural Resources, and Fisheries; others are affiliated with New Mexico's Southwest Research and Information Center, the Texas Parks and Wildlife Board, the City of Tijuana, and an environmental consulting organization.

Once the BECC receives an expression of interest, it may award technical assistance grants to communities to help in proposal preparation.[39] Thus, impetus for nearly all proposed projects arises from local communities themselves—or, at a minimum, finds acceptance at the grassroots level. Such acceptance is in fact an explicit requirement for certification. From the design phase on, projects are required to have public advisory committees (refer to Figure 5). The memberships and self-defined missions of these committees have differed considerably from project to project, and the overall effectiveness of this attempt at incorporating public input has been difficult to gauge. But, although these committees rarely appear to be independently guiding projects, some NGOs consider their presence to be positive (C. Reed, Texas Center for Policy Studies,[40] personal correspondence, March 5, 1999). As environmental consciousness and technical capacity grow in communities on both sides of the border, the existence of public advisory committees offers potential for improved communications and more collaborative decision making.

Because eventual project implementation loans from the NADB must be repaid, the expense to local governments may raise grassroots inquiries as to whether the potential benefits of a project will outweigh its probable costs. Such questions were raised loudly at the January 1996 BECC public meeting in Nogales, Sonora. At that meeting, the commission considered and provisionally approved certification of a new water delivery system, the Acuaférico project. Members of the Zapatista Front, a radical community organization, objected to the expected high cost of the project, which, they maintained, would be borne primarily by poor residents (Hartman, 1996; Reed, 1996).

In effect, the BECC offers a new kind of forum, one in which border residents are able to address problems they have in common—problems that may be of minor concern to the rest of the nation. Prior to NAFTA and the advent of the BECC, when communities or residents on the U.S. side of the border wanted new water infrastructure projects, they vied for the attention of national legislative or executive leaders, who remained more responsive to more central, more populous, and more economically powerful locales and regions. Because the BECC's actions are funded in the ensemble by annual congressional appropriations and not on a project-by-project basis, communities seeking projects can apply directly to the BECC, bypassing the lobbying that was previously required. In Mexico, where community "lobbying" is accomplished through patronage and traditional party politics rather than via the channels that have prevailed in the United States, the BECC's more direct, binational approach also has helped accelerate devolution from

39. Funding for technical assistance is from the BECC Technical Assistance Program, which has $10 million contributed by the U.S. Environmental Protection Agency.

40. A respected environmental NGO that has tracked BECC's performance and its adherence to public participation criteria.

central authority. By design, the BECC process thus has made the periphery the center of concern.

REJECTING SECRECY: OPEN DESIGN PROMOTES TRANSPARENCY

The concepts of bottom-up decision making and openness are twinned. Prior to the creation of the BECC, binational environmental problems categorically had to be routed through national capitals thousands of kilometers away in order to attract the attention of the IBWC/CILA.

As we have shown, the BECC's structure is unusual among international organizations in the opportunity it provides for public participation. Not only does a member of each nation drawn from the public-at-large sit on the board of directors, but the BECC's charter also calls for it to maintain an advisory committee. When requested to do so by the board, this 16-member binational BECC Advisory Council (whose members are from the 10 Mexican and U.S. border states; see Figure 5) advises the board on implementation matters or policy. At public meetings of the commission, proposed projects are referred to this advisory group for comment during certification deliberations. The intent is to have representatives of diverse regions and sectors within the border area sit down together and identify areas of common concern. Since the initiation of this process, the role of the advisory board has diminished in practice as the two governments have allowed members to leave the board without replacements. Significantly, the BECC's emphasis on public participation is paired with what has proven to be a commitment to openness. The advisory board meets quarterly, and thus far only geographical distance seems to be a barrier to attendance. Those who attend witness open discussions that have been remarkably free of hidden agendas, secrets, and manipulation. Decisions are never final until voted on publicly—and then only after public input, questions, and discussion. On several occasions, projects thought to be all but approved were sent back for redesign following the public comment period.

The BECC's charter contains explicit provisions for public participation. As part of this obligation, the BECC must ensure public access to documents for all proposed projects requesting certification. In all such cases, it must arrange opportunities for public comment. Groups affected by proposed projects may also submit comments directly to the board of directors. In pursuing its twinned goals of openness and participation, the commission has been aided by BECCnet, an Internet-based discussion group.[41] As of mid-1999, BECCnet subscribers in the two countries include government officials, academics, and scholars; NGO representatives; concerned community groups; private sector stakeholders; and ordinary citizens. Since its initiation in 1995, BECCnet has significantly influenced decision making on a number of occasions. From the start, the discussion group was instrumental in the design of the BECC's policies and procedures. The commission's project selection criteria, specifically with regard to the need for openness and sustainability, were vetted on BECCnet, and several of the suggestions found their way into the actual, published criteria. Similarly, rules requiring set periods for meeting notification and project consideration were aired on the listserv; at least once, a scheduled public meeting had to be postponed by a month because NGOs writing on BECCnet pointed out that the commission had failed to adhere to its own guidelines. In the same vein, when the well-attended April 30, 1996, Ciudad Juárez BECC meeting was gaveled closed without permitting scheduled comments by nearly 20 members of the public, criticism flew across the listserv. The commission's general manager wrote a *disculpa*, or apology, and the BECC posted a procedure to ensure inclusion of public comments at all future meetings. All the while, BECCnet provided an important venue for strong public opinions on perceived conflicts of interest, use of public funds to support private sector projects, and proposed confidentiality rules. As another example, in December 1997, the BECC was forced to downgrade to "provisional" the certifications awarded to projects in Mexicali when BECCnet correspondents pointed out that the 45-day advance notification requirement had not been met.[42] Finally, two additional features of BECCnet are worth noting: (a) posted comments and discussions sometimes lead to productive "off-line" dialogues on substance or procedures and (b) it is significant that throughout its existence, the commission itself has been using the listserv as its quasi-official communications organ.

41. BECCnet@listserv.arizona.edu. This listserver was developed and is maintained by the Udall Center for Studies in Public Policy, University of Arizona. Standard subscription practices operate.

REJECTING THE REGULATORY PARADIGM: CAPACITY-BUILDING DESIGN FOR FLEXIBILITY

Border communities, responding to their pressing need for enhanced infrastructure, have begun to hold open meetings to establish priorities for project proposals. Because many of these communities are both economically disadvantaged communities and lack experience in proposal preparation, the BECC offers technical and financial aid to communities, furnishing them with the resources necessary to prepare sound proposals. Largely as a result of this new source of support, many communities are beginning to articulate unmet needs.

42. These and other instances of BECCnet's influence are documented in the BECCnet Archives (1999). The archives are a month-by-month listing of all BECCnet messages since February 1995.

The commission's growing acceptance of the concepts underlying sustainable development has broadened its priorities to include the upgrading of implementing-agency skills and civic infrastructure. The BECC has noted that few border communities possess the resources or the technical and administrative capabilities to do their own engineering design studies. In fact, the BECC's Technical Assistance Program explicitly recognizes that the very communities that need water infrastructure the most are the ones that are least likely to be able to plan for and pay for such projects.[43] The guidelines for selecting technical assistance consultants do not require that the firms be local or regional, and some observers have criticized the reliance on exogenous resources. Others, especially NGOs, care less about the provenance of the assistance than about the need for the process to remain open and transparent (C. Reed, personal correspondence, March 5, 1999). In any event, the BECC's guidelines favor, whenever possible, investments in human capital, especially the training of environmental managers. Thus, although most frequently the immediate need is for physical infrastructure and the financial base to ensure its long-term operation, certified proposals to date specifically target capacity building.

PERSPECTIVES: THE BECC IN PRACTICE

Along the U.S.-Mexico border, environmental health issues have often gained the greatest notoriety, since downstream recipients of pollution flow often reside on the other side of the frontier. All too frequently, poor environmental health conditions stem from uncontrolled economic development and urban growth, and can lead to public health crises (Ingram et al., 1995). Schisms have appeared in the border communities between environmentalist factions advocating growth control and progrowth factions demanding rapid extension of utilities to all urban areas.

Perhaps the best example of such a disagreement occurred in January 1996, at the BECC meeting in Nogales, Sonora. At that meeting, the commission provisionally certified the Acuaférico, a large water development project for Nogales, Sonora. Proponents of development and urban growth, mostly partisans of Mexico's and Sonora's ruling Revolutionary Institutional Party, argued strongly for the project. But an unusual alliance of centrists and rightists from the Party of National Action and leftists from Mexico's Revolutionary Democratic Party and their allies objected to what they saw as the inequitable rate structure such a project would induce. Joining these political groups in opposition to the Acuaférico was an Arizona-based environmental NGO, the

43. See the BECC Web site for its Technical Assistance Program at http://www.cocef.org/atecnica/tecassis.htm and the comparable NADB site at http://www.nadbank.org/English/Links/becc_tecassis.htm.

Friends of the Santa Cruz River, which worried that larger water withdrawals south of the border would diminish flow downstream in Arizona (Reed, 1996; see also BECCnet Archives, 1999). Nonetheless, several projects have garnered widespread community support. In striking contrast to the controversial water supply project across the state in Nogales, the Integral Project for Water, Sewage and Wastewater Treatment of Naco, Sonora, drew uniformly strong support from the public sector and from environmental groups. This project, which attempts a comprehensive solution to water supply, wastewater collection, and treatment, was backed by the local and state governments and by Enlace Ecológico and the Border Ecology Project (both binational environmental coalitions); it also benefited from strong community input during the design phase.

The relationship between the BECC and its sister organization, the NADB, is a work in progress. Although the commission carefully considers financial feasibility prior to certification, the lack of full articulation with the bank has slowed the implementation of BECC-certified projects. The lag between certification and financing was particularly evident during the first years of operation: During that time, only 4 of 21 BECC-approved projects had obtained NADB financing. Partly as a result of deliberate attempts by the leaderships of the two institutions to improve coordination between them, the pace has since accelerated: Of the 27 projects now certified (15 in the United States and 12 in Mexico), 7 have NADB loans and/or grants approved and closed, and 5 of those projects are under construction. Another 7 projects have NADB financing approved, also with 5 of those under construction. And the bank considers that 6 additional projects have "financing under development." Finally, the 7 remaining BECC-approved projects are not seeking financing through the NADB.

At times there has been tension between the BECC's aggressive desire for project implementation and the NADB's cautious pursuit of leverageable funds. For example, the boards of the two institutions have occasionally disagreed over the importance of public input, transparency and openness in decision making, and project sustainability. To smooth the differing views of the two organizations, in 1998 the NADB entered into a memorandum of understanding with the BECC. Still, the two organizations pursue disparate agendas, which reveals the need for a more integrated approach to project certification and financing. In fairness, it must be recognized that the commission and the bank are new institutions, still in the process of inventing themselves.

Over the past 2 years especially, to better coordinate its efforts with those of the BECC, the NADB has introduced several programs that leverage funds creatively, favor poor communities, and attempt to increase capacity. These new efforts have drawn high marks from some community observers. Among these are the NADB's (a) Border Environment

Infrastructure Fund, established with an initial EPA grant of U.S. $170 million and made available to disadvantaged communities for construction costs or debt-service repayments; (b) Institutional Development Cooperation Program, designed to strengthen the institutional capacities of water-related public utilities via provision of personnel for technical and planning assistance and support for management and financial training; (c) Solid Waste Pilot Program, to help communities pay for expensive municipal solid-waste facilities; (d) Cooperative Credit Agreement Program, to target small, low-income communities with professional and institutional support; (e) Mexican Lending Mechanism, to allow financing of public sector projects in Mexico in accordance with the restrictive Mexican Constitution; and (f) Community Adjustment and Investment Program, an original feature of NAFTA that is not linked to BECC certification (BECC & NADB, 1998-1999).[44]

In the area of community participation, the BECC has come to exceed many of the prescriptions of its design. Project sponsors must now hold a minimum of two public meetings, as well as private meetings with representatives of interested community organizations; establish a steering committee to conduct local outreach activities; make available for public review the project proposal and related information; and submit a report on the extent to which the community understands and supports the proposed project. The BECC encourages public debate by requiring sponsors to conduct an environmental assessment, which needs to include anticipated positive and negative impacts of the proposed project. The BECC has also provided funds to cash-strapped Mexican NGOs in order to broaden the public debate. To make information available to the widest possible community, the BECC maintains and regularly updates a bilingual Web site on the Internet.[45] Finally, to encourage dialogue within the diverse border community on both sides of the frontier, the BECC participates promptly and openly in the independent BECC-net electronic discussion group. In spite of the sum of these efforts and perhaps largely because of the relatively low economic status of the border region, only a small proportion of the borderlands' population is even aware of the BECC's existence.

Upholding sustainable development criteria is central to the BECC's mission. Despite an uncertain start, the BECC has now made the sustainable development criteria mandatory and has instituted guidelines that enable its board to grant "high-sustainability" recognition to exceptional projects. Minimally, the sustainable development component of a proposed project addresses issues such as the conservation of natural resources, the capacity building of institutions and individuals, and

44. The very fact that NADB and BECC have begun issuing joint reports is a meaningful measure of their resolve to improve relations. See also North American Development Bank (1999) and the NADB Web site at http://www.nadbank.org.

45. http://www.cocef.org had over 10,000 hits in its first 19 months of operation.

community development. Proposed projects must also conform to all applicable environmental regulations and to any local or regional conservation plans. To achieve high-sustainability status, projects must specifically promote sustainable development in two areas from each of the certification criteria.

The BECC has made significant progress in its first years. It has already demonstrated that it is capable of interpreting its mandate, defining its agenda, implementing rules and procedures, devising certification criteria, and approving proposals. All of these achievements have taken place in a fishbowl of increasing openness and transparency. In the process, the BECC has shown that it is able to respond positively to criticism and accommodate public input. The tasks ahead include taking steps to ensure its institutional survival and to clarify its functional value to a larger contingent of the borderlands' residents.

The BECC Paradigm as a Template for Transboundary Environmental Institutions

In this article, we have underscored how national power centers all too often impose transboundary river basin management regimes on peripheral border communities, with little or no weight given to local concerns. Frequently, environmental protection in these regimes has been belatedly appended to the accords' original purpose, that of ensuring navigation. Some accords endure only on paper; although a secretariat may exist, implementation of cooperative projects or environmental protection remains elusive. In the second half of this article, we have proceeded to sketch how a new model of cooperation across borders has evolved, one that adopts the Agenda 21 perspective suggesting that transnational environmental commissions manage the environment holistically (United Nations Development Programme, 1992).

A transboundary environmental institution such as the BECC is in many ways preferable to the dominant forms of older institutions found in extant river basin accords, for the BECC consciously engages in sustainable development. By virtue of this and other innovative features, the BECC can offer a template for managing transnational resources—one that is a radical departure from the paradigms adopted by most river basin accords. The BECC elevates regional proximity to the frontier above nationalism, focuses on inclusiveness through public participation, espouses openness of form and function, builds local capacity, and operates, for the most part, quite transparently. The commission derives its strength and uniqueness by elevating local needs to the forefront of its deliberations.

However, the BECC paradigm presumes that the countries sharing resources and responsibilities are motivated by Western-style democratic

ideals and maintain more or less friendly relations with each other. This presumption may compromise the paradigm's application elsewhere. In some cultural settings, many of the traits inherent in the BECC paradigm are perceived as weaknesses—leaders who turn to the people are seen by their constituents as ineffectual. In other countries, data are viewed with military secrecy and tied to issues of national security.

Yet, even if embraced with qualifications, a modified BECC-type model may successfully nudge recalcitrant nations toward greater cooperation over environment and natural resources, thereby enhancing environmental security and defusing boundary flash points. In such situations, a reduction in tension between neighbors in and of itself can be viewed as a tentative step toward sustainable development. If concurrent benefits include cleaner water or more breathable air, the net gains are even greater.

In conclusion, the emergence and evolution of the post-NAFTA environmental institutions in the U.S.-Mexico border region is a large transnational experiment, one that recognizes that sustainable development links economic prosperity with quality-of-life issues. To achieve either without the other is neither practicable nor equitable. The BECC model has been exemplary in focusing on the needs and ambitions of border residents, in following a path toward sustainable development, in offering a viable and dynamic alternative to the usual secrecy at the core of diplomatically-driven decision making, in demoting the world's prevailing focus on engineering solutions, and in beginning to promote a vision of social equity. Clearly, different situational contexts require different solutions, and this implies that export of the BECC-NADB model faces significant difficulties. Nonetheless, the U.S.-Mexico experience offers hope that the model's roots—openness, transparency, capacity building, and bottom-up design, all in the context of sustainable development—will take hold in other transboundary areas.

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Illegal Whaling for Humpbacks by the Soviet Union in the Antarctic, 1947-1972

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This article presents an analysis of the Soviet Union's whaling for humpbacks in the Antarctic in the 1950s and 1960s, which violated regulations set by the International Whaling Commission (IWC). Recently compiled archival records from the Soviet Union indicate that Soviet whalers took a greater number of humpback whales in the Antarctic from 1949 to 1972 than all other whaling fleets combined. The number of humpback whales the Soviet fleet took from the Antarctic in 1961 and 1962 was several times higher than that which IWC biologists then believed to be sustainable. The USSR submitted false reports to the IWC and stalled the creation and implementation of a system of international observation for years. This article suggests that the history of the IWC, the first environmental organization to be global in scope, points to weaknesses in contemporary environmental treaty regimes. Like the Whaling Convention in the 1950s and 1960s, many environmental treaties today are not well monitored. By the time its international observer scheme began operating in 1972-1973, the damage inflicted on whale populations, including humpbacks, was severe.

This article reviews archival records of the Soviet Union's illegal whaling in the Antarctic in the 1950s and 1960s. It documents negotiating tactics the USSR used to delay implementation of an international observer scheme for more than 10 years, as Soviet factory ships whaled illegally and submitted false reports to the IWC. Although species other than humpbacks were taken illegally, and the USSR was not the only whaling state that violated IWC rules, this article focuses on humpback whales to illustrate the severity of the illegal whaling and misreporting. For example, Soviet whalers took a greater number of humpback whales in the Antarctic from 1949 to 1972 than all other whaling fleets combined.[1] The number of humpback whales[2] the Soviet fleet took from the Antarctic in 1961 and 1962 was several times higher than that which IWC biologists then believed to be sustainable.[3] This article argues that the history of the

1. Zemsky, Berzin, Mikhalyev, and Tormosov's (1995) data compared with BIWS data for all whaling states reprinted in McHugh (1974). The data are shown in Tables 1 and 2, respectively.

2. Humpback whales are listed as an endangered species by the U.S. government and the International Union for the Conservation of Nature.

3. Zemsky et al. (1995). Tønnessen and Johnsen (1982, p. 546) cited IWC biologists who concluded in the late 1950s that a sustainable take of humpbacks from the Antarctic would be about 720 per year. The USSR's whaling fleet took 12,944 humpbacks in 1960 and 12,529 in 1961, according to the figures released by Zemsky et al.

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