Conflict and Cooperation along International Rivers: Crafting a Model of Institutional Effectiveness

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Introduction

In the realm of international water resources management, institutions play important roles in mitigating conflict and promoting cooperation by allowing resource users to handle rapidly changing physical or political conditions.[1] Since the 1990s, we have witnessed a significant growth in the creation of institutions at the river-basin level.[2] Such institutions are thought to be important in promoting cooperation between upstream and downstream states, helping to standardize water policies across states, serving as forums to bring together diverse stakeholders, and overcoming fragmented management efforts.[3]

Yet, building and maintaining institutions that promote international cooperation is not a simple task, particularly when there are multiple actors involved in complex decision-making processes. Institutions designed to promote cooperation along shared rivers may distribute costs and benefits unequally, thereby perpetuating existing inequalities.[4] Or, they may lack the institutional, financial, or technical capacity to solve problems.[5] Even when specific organizations are well funded and staffed, they may fail to be effective if they cannot overcome adversarial situations and promote consensual approaches to decision-making.[6]

In this article, we build a model that explores the conditions under which

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1. Hensel, Mitchell and Sowers. 2006; Mitchell and Hensel 2007; Wolf 2007; and Fischhendler 2008.
2. Gerlak and Grant 2009.
3. Pahl-Wostl 2007, 55.
4. Wolf et al. 2005; and Wester and Warner 2002.
5. Delli Priscoli 2009.
6. Verweji 2000.

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institutions are most likely to foster meaningful cooperation in the management of shared rivers. To do so, we draw from a diverse literature on social and ecological systems, international institutions, and common-pool resources to expose the expected relationships between a number of critical variables and cooperative solutions to conflicts in the management of shared waters. We provide an initial test of this model by analyzing the conflict that took place from 2003 to 2010 between Argentina and Uruguay over the construction of pulp mills along the Uruguay River, and assessing the role of the Administrative Commission of the Uruguay River (from now on, CARU for its Spanish acronym) in this conflict and its resolution.

The study of the conflict between Argentina and Uruguay is important for two main reasons. First, this case offers insights on how institutions designed to promote interstate cooperation in transboundary resource settings can fail to be effective, thereby requiring the intervention of a third party to reach a solution.[7] Second, the conflict illustrates how international conflict over the management of a shared natural resource can seriously cripple longstanding political relationships characterized for the most part by a strong history of collaboration.

Crafting a Model of Institutional Effectiveness along International Rivers

There is a rich literature exploring the design features of institutions that deal effectively with environmental problems.[8] However, the analysis of institutional performance depends heavily on context and type of institution.[9] Here we are interested in the study of institutions that set the conditions under which international river basins are jointly managed by two or more states. While a significant body of research is developing around institutional performance in the context of international river management,[10] more research is needed to identify the specific institutional features that are most likely to lead to collaborative solutions to common problems in international river basins.[11]

In this article, we craft a model that contains these features and show how they are supposed to contribute to the solution of problems. Figure 1 contains the model. At the bottom of the figure lies the desired outcome of finding collaborative solutions to common problems. The top part of the figure contains two variables—political culture and the state of the ecological

7. This case is only the second occasion where two countries at odds over water issues resorted to the International Court of Justice (Cosgrove 2003). The dispute between Hungary and Czechoslovakia over the proposed damming of the Danube River at Gabcikovo-Nagymaros was settled in 1997. See Fuyane and Madai 2001.
8. For example, see Young 1999; Keohane and Levy 1996; Helm and Sprinz 2000; Andresen and Hey 2005; and Breitmeier, Young, and Zürn 2006.
9. Gutner and Thompson 2008.
10. For example, see Nakayama 1997; Kliot, Shmueli and Uri 2001; Marty 2001; Rieckermann et al. 2006; Siegfried and Bernauer 2007; and Dombrowsky 2008.
11. Bernauer 2002; and Bernauer and Kalbhenn 2010.

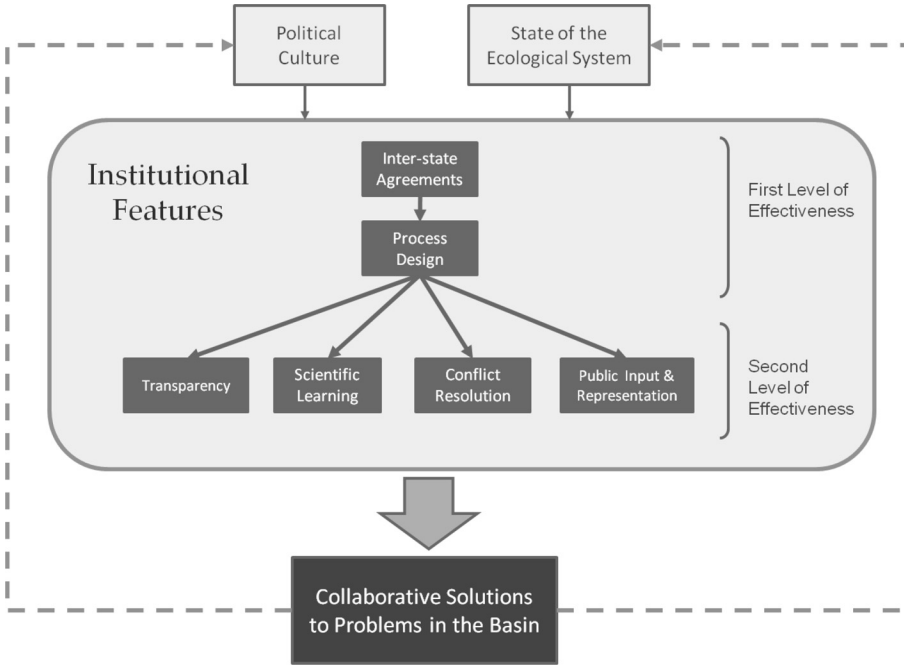

Figure 1.
A Model of Institutional Effectiveness along International Rivers

Source: Prepared by authors.

system—that are likely to influence the design and functioning of specific organizations but that are also likely affected by the outcome of institutional performance, as represented by the dashed arrows moving upwards from the cooperative solutions originated by the institutional intervention.[12] Between those variables we include the institutional features that we analyze closely in this article.

Building from the rich literature on institutional effectiveness and performance, we argue for a multi-faceted definition of institutional effectiveness that speaks to the broad capacity of the institution to perform the tasks for which it was designed. We examine effectiveness at two levels: first, a broader level focused on the interstate agreement itself; and second, a level addressing the process design elements. In so doing, we integrate across diverse streams of research, including research on social and ecological systems, adaptive governance in the management of common pool resources, and international institutions.

The first level of effectiveness speaks to the interstate agreements that com-

12. Barraqué and Mostert 2006.

monly govern international rivers, which in turn structure and shape the relationships among all parties involved in the use of the common resource.[13] Interstate agreements often incorporate internationally recognized management principles such as "equitable and reasonable utilization" of shared watercourses, or the principle that states shall undertake all necessary measures to ensure that such utilization does not lead to any of the other riparian states suffering "significant harm."[14] In some cases, river basin commissions work as venues for state interaction and assist with information exchange and the achievement of settlements.[15] Under this first level of effectiveness we also include process design, which refers to the complex internal negotiations that usually take place inside new institutions to decide how, when, and under what conditions the parties interact.[16]

Process design in turn affects how states shape the design elements at the second level of effectiveness, which can also be thought of as process challenges that must be continuously faced to ultimately achieve collaborative solutions to problems in the river basin. The first institutional feature at this second level is transparency in the decision-making process. Increasing transparency is a fundamental step to tackle noncompliance among member states[17] but also to give private citizens recourse to redress on unfair actions or incompetence of the executive authority.[18] In the context of institutions that deal with complex water issues that cross political boundaries, transparency increases the ability of multiple participants to understand the inner workings of the decision-making process that affects the management of the natural resource. For instance, in an institutional setting where a given watercourse is managed, information of a technical and legal nature should be available to all interested parties.[19] In other words, transparency allows for all actors involved, including policy-makers, scientists, and the public, to have the *potential* to examine the functioning of the organization.

13. Oregon State University's Tranboundary Freshwater Dispute Database offers a searchable database of some 450 international freshwater-related agreements from 1820 to 2007. See http://www.transboundarywaters.orst.edu/database/interfreshtreatdata.html, accessed 19 October 2011.
14. See Conca 2006; Conca, Wu, and Mei 2006; and McCaffrey 2007 for further details on the specific nature of the concepts and the role they played in the UN Convention on the Law of the Non-navigational Uses of International Watercourses.
15. Haftendorn (2000, 66–67). According to Waterbury (2002, 35), the very process of regime formation (e.g. data gathering, institution building, negotiating) can provide momentum that results in the creation of new institutional interests and expertise.
16. The term "process design" has been used previously in the study of conflict over shared water resources (Scholz and Stiftel 2005). With specific regard to interstate agreements around shared rivers, various studies highlight different "process" dimensions that affect the nature of adopted rules and regulations. For some examples, see Hamner and Wolf 1998; Jägerskog and Phillips 2006; Kistin et al. 2009; Stinnett and Tir 2009; and Gerlak, Lautze, and Giordano 2011. See also the series of UN Environment Programme publications *Hydropolitical Vulnerability and Resilience along International Waters.*
17. Mitchell 1994.
18. Asian Development Bank 1995.
19. Bruch 2000.

The second process design element involves the production and dissemination of scientific knowledge. Fostering the development of a base of widely accepted scientific knowledge is one of the most important contributions that intergovernmental regimes can make since scientific learning is critical for the successful management of complex ecosystems.[20] Of course, the main obstacle to scientific learning is that science is very rarely uncontested; parties with differing goals in a decision-making process often bring their own science to the table of negotiations.[21] This tendency is not unhealthy since scientific knowledge is almost always fragmentary and provisional, but this fragmentation must not function as an obstacle to the advancement of cooperative activities inside the organization.

The third process design element involves conflict resolution. Formal mechanisms for dispute settlement are seen as an important function of an intergovernmental organization's independence.[22] Once an initial agreement is reached among states on the need to jointly manage an international river, successful implementation is dependent not only on the terms of the agreement, but also on an ability to enforce those terms.[23] Better enforcement of rules reduces transaction costs, which in turn "frees" resources that can be used for the establishment of cooperative activities.[24] Many times, however, the terms that govern the interactions among actors are contested or are not clear enough for the parties. When this happens, conflict is likely to erupt and institutions must overcome it through the use of effective conflict-management techniques.[25] While mechanisms to settle disputes can be varied, the most common are direct negotiations, non-binding mediation, or binding arbitration or adjudication by an international institution.[26]

The fourth process design feature addresses public input and representation.[27] It is through deliberation that parties in conflict may develop the trust and social capital necessary for collaboration.[28] The inclusion of mechanisms for public participation ensures that local concerns are incorporated into decision-making processes, which leads to more flexible decisions that are also easier to enforce.[29] A lack of public participation may result in limited support for any agreement reached or may challenge implementation.[30] There are multiple design choices available to address public participation.[31] In transboundary water governance these mechanisms may range from the informal submission of

20. Underdal 2008, 7; and Gunderson and Holling 2002.
21. Adler et al. 2001; and Scholz and Stiftel 2005.
22. Haftel and Thompson 2006.
23. Wolf 1997; and Stinnett and Tir 2009.
24. Hensel, Mitchell, and Sowers 2006.
25. Hansen, Mitchell, and Nemeth 2008.
26. Elhance 2000; and Cosgrove 2003.
27. Lebel et al. 2006.
28. Adger 2000; and Gunderson et al. 2006.
29. Cassar and Mock 2003; and Wester, Merrey, and de Lange 2003.
30. Mostert 2003.
31. Fung 2003.

comments at different stages of the decision-making process to more formal mechanisms that require public input as a component of planned management actions.

Implicit in our model is the recognition that power asymmetries, resulting from the nature of geographic location (upstream versus downstream states) or military and economic disparities, can be expected to influence state interactions at both levels of effectiveness and may result in inequitable outcomes.[32] Importantly, we see the variables in our model as necessary but not sufficient conditions for a complete explanation of cooperative outcomes to interstate problems and conflicts along international rivers. We turn to an examination of the conflict between Argentina and Uruguay over the construction of pulp mill factories on the Uruguay River, and the role of CARU, the bi-national river basin organization, in the conflict. We use this case as a plausibility probe for our model to determine whether further testing is warranted.[33] Our research methods entail an examination of primary and secondary sources that allow us to assess the role played by CARU in the conflict. These sources include the main newspapers with a nationwide readership in both countries, documents produced by the International Court of Justice (IJC), and in-depth telephone interviews with key participants in the conflict.

Pulp Mills Conflict along the Uruguay River

The Uruguay River is part of the La Plata River basin, one of the largest basins in the world. The river, which is approximately 1750 kilometers long, forms in the coastal range of southern Brazil and runs mostly to the south. The Uruguay joins the Paraná River to form the La Plata River, which in turn runs into the Atlantic Ocean. In its northern section, the Uruguay River serves as the border between Argentina and Brazil, while its southern part separates Argentina from Uruguay.

Historically, the La Plata basin was characterized by conflict over water use and management, but the tenor of the political relationships changed dramatically in the basin in the late 1960s when the five riparian nations (Argentina, Bolivia, Brazil, Paraguay, and Uruguay) came together to harness the potential of energy development in the region. In 1969, they signed the La Plata River Basin Treaty to promote a more balanced development strategy, and this accord prompted a wave of bilateral and multilateral cooperation in the region in the 1970s. One example is the *Statute of the Uruguay River* signed by Argentina and Uruguay in 1975. The accord established that a country pursuing actions that may modify the river's regime must properly notify its counterpart (Article 7), with the latter having the chance to respond to such actions—for instance, de-

32. Frey 1993; Lowi 1993; Zeitoun and Allan 2008; and Zetouin and Mirumachi 2008.
33. Eckstein 1991, 147.

manding more information about the proposed activities (Articles 8, 9, 10, and 11). To channel communications between the two parties, the **Statute** created the Administrative Commission of the Uruguay River (CARU), which was mandated to coordinate the actions of both nations in regards to the use of the river and given the prerogative to dictate norms to regulate such actions.

CARU started functioning in 1978 and is governed by ten commissioners, five from each country. They form the so-called "national delegations," the heads of which alternate annually as president and vice president of CARU. Additionally, CARU has ten "sub-committees" that meet regularly and advise the national delegations in technical and administrative matters.[34]

Historically, CARU never had to assume an active role in defusing conflict between the two states but this began to change in 2002 when the Uruguayan government led by then-President Jorge Batlle authorized the Spanish company Ence S.A. to build a pulp mill on the Uruguayan side of the river, about 12 kilometers upstream from the city of Fray Bentos (see Figure 2). Initially, the signing of the contract was received with mixed reactions in Uruguay.[35] The main opposition party, Frente Amplio, along with some environmental NGOs, opposed the construction of the mill, and sought the support of allies in Gualeguaychú, an Argentine city located on the western shore of the river and connected to Fray Bentos through the international bridge "Libertador San Martín."

Although CARU was the natural forum and appropriate legal entity for the deactivation of this as-yet minor conflict, the Uruguayan government initially worked to sidestep CARU's efforts to oversee the process. For example, requests from the president of CARU to view the 2002 Environmental Impact Assessment submitted by Ence to Uruguay's National Directorate for the Environment were met with considerable delay.[36] The role of CARU in the process continued to grow weaker, and the national delegations even cancelled their meetings for a six-month period after the Uruguayan government unilaterally authorized the construction of the mill in October of 2003.

CARU resumed activities in April of 2004 when it held meetings with representatives from a second company interested in building a mill—Botnia Fray Bentos S.A., a subsidiary of the Finnish corporation Metsä-Botnia. Following this and subsequent meetings, CARU's Subcommittee on Water Quality and Pollution Control suggested that more information was needed from the company before the Uruguayan government could extend an environmental authorization. However, in one of his last decisions in office, outgoing Uruguayan President Jorge Batlle authorized the construction of this second pulp mill in February of 2005. This projected mill would have the capacity to produce one

34. For a full description of the organizational structure, see "The River Uruguay Executive Commission," available online at http://www.caru.org.uy/publicaciones/The-River-Uruguay-executive-commission-Uruguay-Paysandu.pdf, accessed 4 February 2011.
35. Alvarado 2007.
36. ICJ 2010.

Figure 2.
Map of the Uruguay River Basin and Location of the Pulp Mill Built by Botnia

Source: Prepared by authors.

million tons of pulp annually, or double the capacity of Ence's mill, and would be located even closer to the city of Fray Bentos (five kilometers upstream). The Argentine delegation in CARU questioned Uruguay's decision to grant the permit as a violation to the 1975 *Statute of the River Uruguay*, but the protest did not resonate with the Uruguayan delegation. This decision by the Uruguayan government to grant authorization to a second company was a turning point in the conflict because it ignited very powerful protests in the Argentine city of Gualeguaychú, to which the Argentine national government became highly responsive.

In April 2005, more than 40,000 people gathered at the international bridge to stage a massive protest against Uruguay's decision, and in May 2005 a new social movement was formed in Gualeguaychú that spearheaded the most vocal opposition to the projects to build pulp mills. The movement, crystallized in the formation of the Citizens' Assembly for the Environment ("the Assembly"), and became one of the key actors in the conflict and remains highly active today.

Responding to the mounting social opposition to the Uruguayan decision to allow construction of the mills mounting on the Argentine side, the two governments attempted one final negotiating effort—outside of CARU. In May of 2005, the two presidents announced the creation of the so-called High Level Working Group (GTAN), a bi-national commission tasked with analyzing the environmental impact of the mills. GTAN would work for a period of six months to produce a non-binding joint report with recommendations to both governments on how to proceed. Its efforts quickly stalled, however, when the Assembly criticized the initiative as merely an effort to neutralize the protests, and because of the perception that the non-binding report would not lead to actions.[37] The governor of the province of Entre Rios (where Gualeguaychú is located) sided with the Assembly, and as a sign of protest the Uruguayan government withdrew its representatives from some of GTAN's meetings. The group finished its work in January of 2006, but instead of a joint report, each country's delegation produced its own separate report.[38]

By then, it was becoming obvious that the existing set of formal institutions in place to facilitate a negotiated bilateral solution to the problem had become ineffective. With the possibility of reaching an intergovernmental agreement dwindling, Uruguay and Argentina opted to litigate the dispute. The Argentine government instituted proceedings against Uruguay in the ICJ on May 4, 2006 for breach of the *Statute of the Uruguay River*.[39] The statute contains a series of articles (7 to 12) to ensure that each country communicates its actions properly to the other when those actions may affect the joint use of the river. The statute also explicitly forbids actions that may threaten the environmental health of the river (Articles 35, 36, and 41). The main argument presented by the Argentine legal team to the ICJ was that the Uruguayan government had fail to notify the Argentine government properly about its plans to allow construction of the mills, and that Uruguay had not been able to prove

37. Aboud and Museri 2007.
38. *La Nación*, 31 January 2006. See also the report of the Argentine delegation, "Informe de la Delegacion Argentina,al Grupo de Trabajo de Alto Nivel," available online at http://www.cancilleria.gov.ar/portal/novedades/informe.pdf, accessed 19 October 2011; and the report of the Uruguayan team, "1er Informe de la Delegación Uruguaya sobre el Trabajo del Grupo Técnico Binacional de Alto Nivel para el Estudio de las Plantas de Celulosa," available online at http://www.presidencia.gub.uy/_Web/noticias/2006/01/delegacionuruguaya.pdf, accessed 19 October 2011.
39. ICJ 2006a; and ICJ 2006b. The Statute contemplates that either one of the parties may bring an unresolved dispute to the IJC for interpretation (article 60).

that the mills would not contaminate the river. Argentina demanded the halting of the ongoing construction of Botnia's mill. Uruguay, on the other hand, argued that there had been no violations to the statute on its part, and that Argentina instead had agreed to the construction of the mills in bilateral negotiations that took place inside CARU in June of 2004—a claim the Argentine team regarded as inaccurate. In July 2006, the ICJ reached a verdict, rejecting Argentina's request to halt construction by fourteen votes to one. The court concluded that Argentine representatives did not demonstrate that contamination would result from the operation of the mills.

In the middle of this conflictual environment, Ence (the Spanish company that had obtained the first authorization) balked and announced in September 2006 that it would not build its mill in Fray Bentos but in the town of Punta Pereira, located downstream from the originally planned site.[40] In November, the World Bank approved a US$170 million loan to Botnia to finish construction of its mill.[42] This decision led the Assembly to block traffic indefinitely on the international bridge "Libertador San Martín."[42]

Argentina brought the issue back to the ICJ in 2007 with new scientific evidence to back its position, just as the Uruguayan government authorized Botnia to start production at the mill. The ICJ procedure was lengthier this time, with the court arriving at a decision only in April of 2010. During this period, the Assembly continued protesting by permanently blocking traffic on the international bridge. In its decision, the International Court of Justice concluded by eleven votes to one that Uruguay had breached its procedural obligations to communicate its intended actions under Articles 7 through 12 of the 1975 *Statute of the River Uruguay.* However, the Court also concluded by a vote of eleven to three, that Uruguay had not breached its substantive obligations under Articles 35, 36, and 41 of the statute, which meant that its actions had not endangered the environmental health of the river. In other words, the court found that the Uruguayan government failed to communicate its actions properly to its Argentine counterpart through CARU, but that this failure did not have a measurable impact on the ecological balance of the shared water resource. The tribunal also found that both countries have an obligation to settle future disputes through CARU, in accordance with the *Statute of the River Uruguay.*

An Examination of CARU's Role in the Conflict

Argentina and Uruguay are two nations with a long history of economic and political cooperation, but for eight years they were involved in a contentious inter-

40. Later, in 2009, Ence sold part of its Uruguayan assets to Stora Enso and Arauco, two companies (from Sweden and Chile, respectively) that operate jointly in Uruguay and Brazil. The assets included approximately 130,000 hectares of land and plantations, plus the mill site at Punta Pereira. The mill is scheduled to start operations in 2013.
41. *El País,* 21 November 2006.
42. The Uruguayan government made a presentation to the ICJ on November 29, 2006, demanding that the Argentine federal government clear the roads and punish the blockaders. The ICJ rejected Uruguay's claim in January of 2007.

national dispute over the use of a common natural resource. We find that CARU's ineffectiveness to serve as a conflict-diffusion venue was one of the main reasons for the escalation of this disagreement.

The First Level of Effectiveness

The case history shows that CARU's single biggest problem was its manifest incapacity to function as an open arena where conflicts could be brokered. The Uruguayan government viewed CARU not as a body with autonomous powers, but rather as just another mechanism established to facilitate cooperation.[43] In its 2010 ruling, the ICJ countered this view, in line with Argentina's position, stating that CARU is the key body for coordination between the countries since it has "regulatory, executive, administrative, technical, and conciliatory functions . . . (and the capacity to properly implement) the rules contained in the 1975 Statute."[44] This basic failure in what we call the first level of effectiveness in our model undoubtedly conditioned the functioning of the organization and its ability to broker conflict and foster cooperation.

The Second Level of Effectiveness

The pulp mill case illustrates how the four design elements of the model play out in the context of the operation of CARU. First, we explore how the element of transparency operates in the context of CARU and this conflict. The *Statute of the Uruguay River* explicitly establishes mechanisms to ensure that both governments are accountable to each other for their actions. Article 7, for instance, directs that any party that engages in ". . . works important enough so as to affect navigation, the river regime or the quality of the waters" must notify CARU. The notified party then has six months to reply (Article 8), during which it may object to the works (Article 9), inspect them (Article 10), and suggest modifications (Article 11). According to the ICJ ruling of April 2010, all of these articles were breached by Uruguay, which did not notify CARU properly about Ence's and Botnia's mills projects ". . . despite the requests made to it by the Commission . . . on several occasions."[45] The behavior of the Uruguayan government clearly hampered CARU's effectiveness and raises concerns about the commission's ability to solve conflicts of a reasonable magnitude.

The second design feature entails producing and disseminating scientific knowledge, which can help settle disputes and create a unifying logic on how to manage the shared waters of the river. The *Statute of the Uruguay River* explicitly leaves to CARU the task of coordinating the "joint undertaking of studies and research of a scientific nature" (Article 56). Moreover, CARU may hire experts to work in the different sub-committees that inform the national delegations, and

43. "Conformidad del gobierno por el fallo," *El País*, 21 April 2010; and ICJ 2010, paragraph 84.
44. ICJ 2010, paragraph 86.
45. ICJ 2010, paragraph 106.

which are responsible for the bulk of the science that CARU produces. In the past, CARU had engaged in the production of scientific knowledge to better assess water quality in the river; in particular, CARU had monitored the river through its "Programa de Calidad de Aguas y Control de la Contaminación del Rio Uruguay" (PROCON), a program that screened for the presence of substances in the river that could impair the quality of its waters. PROCON was complemented by a second program named PROCEL designed in 2005 (Plan de Monitoreo de la Calidad Ambiental del Rio Uruguay en Areas de Plantas Celulosicas), but both programs ceased to collect and analyze data in early 2006 as the conflict moved to the litigation stage.

From that point forward, the production of scientific knowledge in the area became excessively fragmented, which further impaired the chances of arriving at negotiated agreements. For instance, the water-quality evidence received by the ICJ regarding the Botnia mill's impact included data collected by two Argentine universities, the Uruguayan Agency of Sanitary Works, the Uruguayan National Directorate for the Environment, and Botnia itself. These data were collected in different sites, at different points in time, and with different working methodologies.[46]

Interestingly, the challenge of producing scientific knowledge is one that both the ICJ and local stakeholders from both sides of the river argue should be a central task of CARU. The ICJ found in its verdict of April 2010 that

> both Parties have the obligation to enable CARU . . . to exercise . . . the powers conferred on it by the 1975 Statute, including its function of monitoring the quality of the waters of the river and of assessing the impact of the operation of the Botnia mill on the aquatic environment (paragraph 266).

The Mayor of the Department of Rio Negro, where Botnia's mill is located, echoes this argument:

> So far, CARU has lost the opportunity to be the great center of environmental research that it could be, not only to monitor Botnia, but also to control other potential contaminants, from sewage from different towns to stormwater runoff that carries large amounts of agrochemicals to the river.[47]

The third design feature at the second level of effectiveness is the provision of effective tools to manage conflict. CARU is itself a conflict-management tool, since the organization is the main conciliation body in any disputes that emerge between the parties regarding the management of the river (*Statute of the River*

46. Additionally, the International Finance Corporation (part of the World Bank and partial financer for the construction of Botnia's mill) also released reports starting in 2006. Since Botnia's mill started operations, the international NGO Green Cross has produced different reports concluding as well that the mill has not modified the quality of water in the river or the equilibrium of the local ecosystems. All these previous scientific documents have been questioned by some as politically motivated and methodologically flawed (see for example Matta 2009).

47. Personal communication with Omar Lafluf, Mayor, Department of Rio Negro, Uruguay, 11 February 2010.

Uruguay, Article 58). The two governmental delegations have the responsibility to settle disputes that may arise, but of course, this can only happen when the institution is recognized jointly as the proper setting to conduct negotiations. In this case, Uruguay opted to negotiate outside CARU, and the organization's capacity to channel conflict was never truly tested.

The final design feature we identify in our model addresses participation and representation of stakeholders beyond the two nation-states, including but not limited to NGOs, local and regional governments, and business interests. It is important to keep in mind that CARU was created more than 30 years ago, when environmental concerns were not widespread and public participation in decision-making processes in these types of organizations was almost non-existent. The way CARU formally addresses problems today is a reflection of that state of affairs, since only the two national states are parties in any negotiations over river issues (Article 2). Even if this mechanism of reaching decisions was adequate when CARU was created, it seems to be faulty in current times, as noticed by a spokesperson for the Citizen's Assembly of Gualeguaychú:

> When CARU was created conflicts had only two parties: the national governments. Today, this is not the case any longer, and decisions must be reached with the consensus of all who live in both the Uruguayan and Argentine sides, who are affected by those decisions.[48]

This view is shared by others, who see CARU's lack of formal inclusion of non-governmental stakeholders in its decision-making process as the greatest challenge to be faced by the organization in the future.[49] Particularly during the early stages of the conflict, the majority of individuals that became active in the newly formed social movements that opposed the construction of the mills, viewed CARU as the arena where a negotiated agreement could be reached.[50] That view quickly disintegrated, however, when it became clear that CARU was unable to function autonomously from the national governments and could not facilitate the channeling of public demands.[51]

A Re-examination of the Model

The study of the chronology of the conflict suggests that CARU failed as a negotiation venue because it was not effective at the two levels identified by the model represented in Figure 1. First, CARU lacked autonomous power to pro-

48. Personal communication with Osvaldo Fernandez, Legal Adviser, Citizens Assembly of Gualeguaychú, 10 February 2010.
49. Personal communication with Silvia Echeverria, Colon Popular Environmental Assembly-Route 135, 3 March 2010; and personal communication with Alejandro Raush, Ex-President, Colon Environmental Association, 4 May 2010.
50. Personal communication with Romina Picolotti, Director, Centro de Derechos Humanos y Ambiente (CEDHA) and former Secretary of Environment and Sustainable Development, Argentina, 8 June 2010.
51. Personal communication with Osvaldo Fernandez, Legal Adviser, Citizens Assembly of Gualeguaychú, 10 February 2010.

mote negotiated solutions to the conflict. This was mainly the result of Uruguay's deliberate efforts to treat the installation of pulp mills as a unilateral issue. But CARU had internal problems as well. For instance, it apparently was not fully prepared to properly assess the impact of the mills on the riverine ecosystem, which some think may be linked to the fact that CARU had historically taken a piecemeal approach to deal with water management problems in the basin.[52] This "too little, too late" style was perhaps the single greatest weakness of CARU before this particular episode of conflict erupted.

Second, the previous shortcomings were coupled with a failure to face successfully the design challenges we grouped under the second level of effectiveness. Of particular importance was the organization's failure to channel in constructive ways the growing public sentiment (particularly on the Argentine side) that the mills could be pernicious for the health of the river's ecosystem. Previous research has suggested that greater involvement of non-governmental stakeholders in water management in the region can help facilitate innovative solutions.[53]

These findings lead to a reassesment of the model we presented in Figure 1. Figure 3 presents a revised model, in which the challenge of public input and representation—previously a component of the second level of effectiveness—has been relocated to an intermediate position between interstate agreement and process design, at the first level of effectiveness.

This change reflects a critical aspect of international water management: given the importance of water as a scarce resource upon which whole communities depend for their livelihood, no decisions should be made without assigning a central role to the representatives of those communities. Particularly in underdeveloped countries without a crisis of scarcity (such as the two countries we study here), policies that affected issues such as water quality were not particularly conflictive historically. This is no longer the case. As citizens embrace environmental values, institutions must give the public enough room for participation to incorporate a wider range of voices into the decision-making process.[54] Incorporating public input and representation will likely be challenging in large basins like this one and will require changes in well-established administrative and legal processes that have historically been impermeable to detailed public scrutiny.[55] But it is useful to keep in mind that solutions to problems of resource management are more likely when all interests are represented *before the decision-making process starts moving forward.*[56]

52. Personal communication with Romina Picolotti, Director, Centro de Derechos Humanos y Ambiente (CEDHA) and former Secretary of Environment and Sustainable Development, Argentina, 8 June 2010.
53. See Marty 2001; Bernauer 2002; and Bernauer and Kalbhenn 2010. See Hochstetler 2002 for a look at how some NGOs in the La Plata basin partnered with international allies to bring pressure on the region's governments and further their water policy agendas.
54. Cosgrove 2003, 99. For a more cautious view on the advantage of widespread participation, see Warner 2006; and Warner and van Buren 2009.
55. Vollmer et al. 2008, 14–15.
56. Berardo 2005.

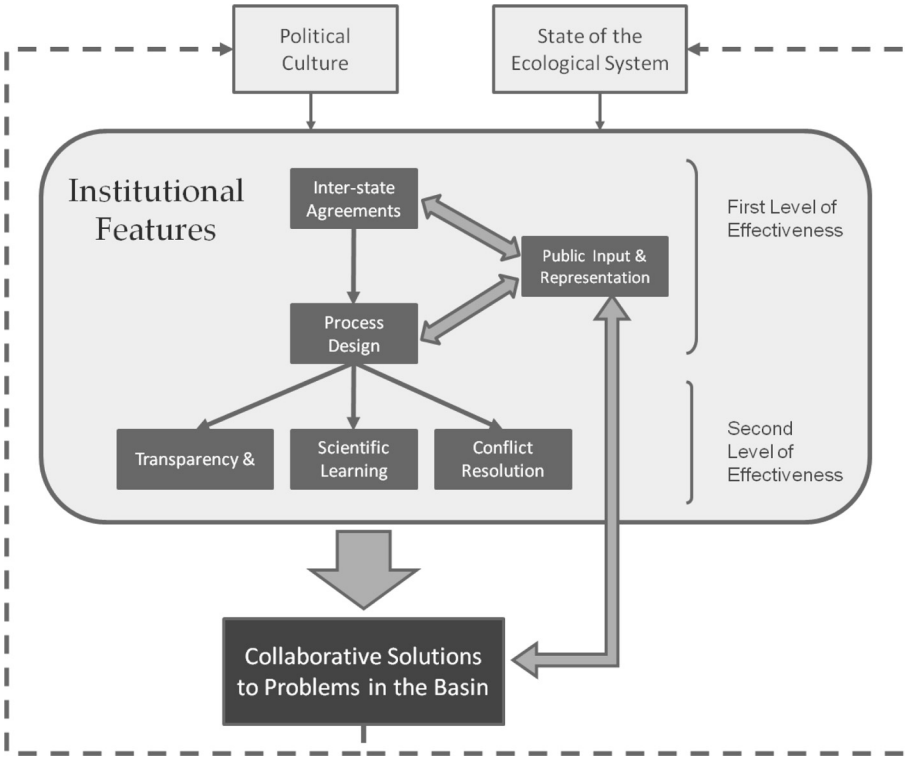

Figure 3.
A Revised Model of Institutional Effectiveness along International Rivers

Source: Prepared by authors

The final change in the model is the addition of a two-headed arrow connecting the desired outcome, reaching collaborative solutions to problems, and the variable of public input and representation. This dynamic linkage is likely when a process that was designed with public input produces a collaborative outcome that generates further public support for the institution. The virtuous cycle represented by this arrow cannot be properly assessed from an empirical standpoint with the analysis of this case study. Future research on design of institutions for international water resources can empirically test this expectation.

Conclusion

Many existing institutions managing international rivers are rooted in an earlier age when top-down designs were the norm and information was not easily accessible to actors who were not formal members.[57] But with the growth in pub-

57. Varady and Morehouse 2003.

lic attention to environmental problems, institutions are increasingly challenged with the need to be responsive to demands posed by actors other than nation-states.

As river basin organizations and other more loosely defined institutions are being created in all corners of the globe today, greater attention to design attributes is necessary to ensure their legitimacy and effectiveness and to promote a balanced management of whole basins. In cases where an institution is not designed from scratch, but rather must adapt to circumstances radically different from those that originally shaped it—as in the case of CARU—changes ~~can~~ be introduced to the organization's *modus operandi* to better equip it to face the challenges we identified in our model. While we recognize the path dependence and challenges associated with institutional change, the CARU case offers some important insights about the potential for institutional adaptation and change and in this case, the ~~future~~ of a river basin organization to successfully adapt to changing circumstances.[58]

Further research will be needed to determine the value of our model across diverse spatial and temporal settings. Further, because we see these components as necessary but not sufficient conditions for cooperation along international rivers, additional research is necessary to tease out the nuances and details of these design features. Specifically, the interrelationships between the two levels of effectiveness should be explored in detail. So too must the interactions within the second level of effectiveness features. Ultimately, we believe it is necessary for decision-makers to evaluate the role of river basin organizations in transboundary resource management with an eye to the design features outlined here, and as part of the broader dialogue around effective governance of shared water resources.

References

Aboud, Lucía, and Anabella Museri. 2007. En Caída Libre. Del Diferendo al Conflicto. In *Del Otro Lado del Río: Ambientalismo y Política entre Uruguayos y Argentinos,* edited by Vicente Palermo and Carlos Reboratti, 15–56. Buenos Aires: Edhasa.

Adger, W. Neil. 2000. Social and Ecological Resilience: Are They Related? *Progress in Human Geography* 24 (3): 347–364.

Adler, Peter S., Robert C. Barrett, Martha C. Bean, Juliana E. Birkhoff, Connie P. Ozawa, and Emily B. Rudin. 2001. *Managing Scientific and Technical Information in Environmental Cases.* Tucson, AZ: US Institute for Environmental Conflict Resolution and the Western Justice Center Foundation.

Alvarado, Raquel. 2007. Politica Forestal, Plantas de Celulosa y Debate Ambiental. Uruguay Tras un Nuevo Modelo de Desarrollo. In *Del Otro Lado del Río: Ambientalismo y Política entre Uruguayos y Argentinos,* edited by Vicente Palermo and Carlos Reboratti, 57–92. Buenos Aires: Edhasa.

Andresen, Steinar, and Ellen Hey. 2005. The Effectiveness and Legitimacy of Interna-

58. Sehring 2009; and Ingram 2011.

tional Environmental Institutions. *International Environmental Agreements* 5 (3): 211–226.

Asian Development Bank. 1995. *Governance: Sound Development Management: Policies and Strategies.* Manila, Philippines: Asian Development Bank.

Barraqué, Bernard, and Erik Mostert. 2006. *Transboundary River Basin Management in Europe.* New York: UNDP.

Berardo, Ramiro. 2005. The East Central Florida Regional Water Supply Planning Initiative: Creating Collaboration. In *Adaptive Governance and Water Conflict,* edited by John T. Scholz and Bruce Stiftel, 64–73. Washington, DC: Resources for the Future Press.

Bernauer, Thomas. 2002. Explaining Success and Failure in International River Management. *Aquatic Sciences* 64 (1): 1–19.

Bernauer, Thomas, and Anna Kalbhenn. 2010. The Politics of Freshwater Resources. In *The International Studies Encyclopedia,* edited by Robert A. Denemark, 5800–5821. Oxford: Wiley-Blackwell Publishers.

Breitmeier, Helmut, Oran R. Young, and Michael Zürn, eds. 2006. *Analyzing International Environmental Regimes: From Case Study to Database.* Cambridge, MA: MIT Press.

Bruch, Carl. 2000. Charting New Waters: Public Involvement in the Management of International Watercourses. UNU Workshop on Southern African International Waters, 25 and 26 September 2000. Sandton, South Africa.

Cassar, Angela, and Gregory Mock. 2003. Transboundary Environmental Governance: The Ebb and Flow of River Basin Organizations. In World Resources Institute, *World Resources 2002–2004,* 158–159. Washington, DC: World Resources Institute.

Conca, Ken. 2006. *Governing Water: Contentious Transnational Politics and Global Institution Building.* Cambridge, MA: MIT Press.

Conca, Ken, Fengshi Wu, and Ciqi Mei. 2006. Global Regime Formation or Complex Institution Building? The Principled Content of International River Agreements. *International Studies Quarterly* 50 (2): 263–285.

Cosgrove, William J. 2003. *Water Security and Peace: A Synthesis of Studies Prepared under the PCCP–Water for Peace Process.* Paris: UNESCO.

Delli Priscoli, Jerome. 2009. River Basin Organizations. In *Managing and Transforming Water Conflicts,* edited by Jerome Delli Priscolli and Aaron T. Wolf, 135–168. Cambridge: Cambridge University Press.

Dombrowsky, Ines. 2008. Integration in the Management of International Waters: Economic Perspectives on a Global Policy Discourse. *Global Governance* 14 (4): 455–477.

Eckstein, Harry. 1991. *Regarding Politics: Essays on Political Theory, Stability and Change.* Berkeley, CA: University of California Press.

Elhance, Arun P. 2000. Hydropolitics: Grounds for Despair, Reasons for Hope. *International Negotiation* 5 (2): 201–222.

Fischhendler, Itay. 2008. Ambiguity in Transboundary Environmental Dispute Resolution: The Israeli-Jordanian Water Agreement. *Journal of Peace Research* 45 (1): 91–109.

Frey, Frederick W. 1993. The Political Context of Conflict and Cooperation over International River Basins. *Water International* 18 (1): 54–68.

Fung, Archon. 2003. Recipes for Public Spheres: Eight Institutional Design Choices and their Consequences. *Journal of Political Philosophy* 11 (3): 338–367.

Fuyane, Bukhosi, and Ferenc Madai. 2001. The Hungary-Slovakia Danube River Dispute:

Implications for Sustainable Development and Equitable Utilization of Natural Resources in International Law. *International Journal of Global Environmental Issues* 1 (3): 329–344.

Gerlak, Andrea K., and Keith A. Grant. 2009. The Correlates of Cooperative Institutions for International Rivers. In *Mapping the New World Order,* edited by Thomas J. Volgy, Zlatko Šabi\\5,99\\, Petra Roter and Andrea K. Gerlak, 114–147. Oxford: Wiley-Blackwell Publishers.

Gerlak, Andrea K., Jonathan Lautze, and Mark Giordano. 2011. Water Resources Data and Information Exchange in Transboundary Water Treaties. *International Environmental Agreements* 11 (2): 179–199.

Gunderson, Lance H., Steve R. Carpenter, Carl Folke, Per Olsson, and Garry D. Peterson. 2006. Water RATs (Resilience, Adaptability, and Transformability) in Lake and Wetland Social-Ecological Systems. *Ecology and Society* 11 (1): 16.

Gunderson, L. H., and C. S. Holling, eds. 2002. *Panarchy: Understanding Transformations in Human and Natural Systems.* Washington, DC: Island Press.

Gutner, Tamar, and Alexander Thompson. 2008. Explaining IO Performance: An Initial Framework. ISA Venture Research Workshop on IO Performance. San Francisco, March 25, 2008.

Haftel, Yoram Z., and Alexander Thompson. 2006. The Independence of International Organizations: Concept and Applications. *Journal of Conflict Resolution* 50 (2): 253–275.

Haftendorn, Helga. 2000. Water and International Conflict. *Third World Quarterly* 21 (1): 51–68.

Hamner, Jesse, and Aaron T. Wolf. 1998. Patterns in International Water Resource Treaties: The Transboundary Freshwater Dispute Database. *Colorado Journal of International Environmental Law and Policy* 9: 157–177.

Hansen, Holley E., Sara McLaughlin Mitchell, and Stephen C. Nemeth. 2008. IO Mediation of Interstate Conflicts: Moving Beyond the Global versus Regional Dichotomy. *Journal of Conflict Resolution* 52 (2): 295–325.

Helm, Carsten, and Detlef Sprinz. 2000. Measuring the Effectiveness of International Environmental Regimes. *Journal of Conflict Resolution* 44 (5): 630–652.

Hensel, Paul R., Sara McLaughlin Mitchell, and Thomas E. Sowers. 2006. Conflict Management of Riparian Disputes. *Political Geography* 25 (4): 383–411.

Hochstetler, Kathryn. 2002. After the Boomerang: Environmental Movements and Politics in the La Plata River Basin. *Global Environmental Politics* 2 (4): 35–57.

Ingram, Helen. 2011. Beyond Universal Remedies for Good Water Governance: A Political and Contextual Approach. In *Water for Food in a Changing World,* edited by Alberto Garrido and Helen Ingram, 241–261. Oxford and New York: Routledge, Taylor and Francis Books.

International Court of Justice. 2010. Case Concerning Pulp Mills on the River Uruguay (Argentina v. Uruguay). 20 April Judgment.

International Court of Justice. 2006a. Application Instituting Proceedings, Pulp Mills on the River Uruguay (Argentina v. Uruguay), I.C.J. Pleadings, 4 May 2006.

International Court of Justice 2006b. Request for the Indication of Provisional Measures submitted by Argentina, Pulp Mills on the River Uruguay (Argentina v. Uruguay), ICJ Pleadings, 4 May 2006.

Jägerskog, Anders, and David Phillips. 2006. *Managing Trans-boundary Waters for Human Development.* New York: UNDP.

Keohane, Robert O., and Marc A. Levy. 1996. *Institutions for Environmental Aid: Pitfalls and Promise.* Cambridge, MA: MIT Press.

Kistin, Elizabeth J., Peter J. Ashton, Anton Earle, Daniel Malzbender, Marian J. Patrick, and Anthony R. Turton. 2009. An Overview of the Content and Historical Context of the International Freshwater Agreements that South Africa has Entered into with Neighboring Countries. *International Environmental Agreements* 9 (1): 1–21.

Kliot, Nurit, Deborah Shmueli, and Uri. Shamir. 2001. Development of Institutional Frameworks for the Management of Transboundary Water Resources. *International Journal of Global Environmental Issues* 1 (3–4): 306–328.

Lebel, Louis, John M. Anderies, Bruce Campbell, Carl Folke, Steve Hatfield-Dods, Terry P. Hughes, and James Wilson. 2006. Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. *Ecology and Society* 11 (1): 19.

Lowi, Miriam. 1993. *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin.* Cambridge: Cambridge University Press.

Marty, Frank. 2001. *Managing International Rivers: Problems, Politics, and Institutions.* Bern, Switzerland: Peter Lang.

Matta, Elias Jorge. 2009. The Pollution Load Caused by ECF Kraft Mills, Botnia-Uruguay: First Six Months of Operation. *International Journal of Environment and Health* 3 (2): 139–174.

McCaffrey, Stephen C. 2007. *The Law of International Watercourses.* New York: Oxford University Press.

Mitchell, Ronald. 1994. Regime Design Matters: Intentional Oil Pollution and Treaty Compliance. *International Organization* 48 (3): 425–458.

Mitchell, Sara McLaughlin, and Paul R. Hensel. 2007. International Institutions and Compliance with Agreements. *American Journal of Political Science* 51 (4): 721–737.

Mostert, Erik. 2003. Conflict and Co-Operation in International Freshwater Management: A Global Review. *International Journal of River Basin Management* 1 (3): 1–12.

Nakayama, Mikiyasu. 1997. Successes and Failures of International Organizations in Dealing with International Waters. *Water Resources Development* 13 (3): 367–382.

Pahl-Wostl, Claudia. 2007. Transitions towards Adaptive Management of Water Facing Climate and Global Change. *Water Resources Management* 21: 49–62.

Rieckermann, Jörg, Helge Daebel, Mariska Ronteltap, and Thomas Bernauer. 2006. Assessing the Performance of International Water Management at Lake Titicaca. *Aquatic Sciences* 68 (4): 502–516.

Scholz, John T., and Bruce Stiftel, eds. 2005. *Adaptive Governance and Water Conflict: New Institutions for Collaborative Planning.* Washington, DC: Resources for the Future.

Sehring, Jenniver. 2009. Path Dependencies and Institutional Bricolage in Post–Soviet Watergovernance. *Water Alternatives* 2 (1): 61–81.

Siegfried, Tobias, and Thomas Bernauer. 2007. Estimating the Performance of International Regulatory Regimes: Methodology and Empirical Application to International Water Management in the Naryn/Syr Darya Basin. *Water Resources Research* 43 (W11406): 1–14.

Stinnett, Douglas, and Jaroslav Tir. 2009. The Institutionalization of River Treaties. *International Negotiation* 14 (2): 229–251.

Underdal, Arild. 2008. The Organizational Infrastructure of International Environmental Regimes. In *The Organizational Dimension of Politics,* edited by Ulf Sverdrup and Jarle Trondal, 186–205. Oslo, Norway: Fagbokforlaget.

Varady, Robert G., and Barbara J. Morehouse. 2003. Moving Borders from the Periphery

to the Center: River Basins, Political Boundaries, and Water Management Policy. *Water: Science, Policy, and Management.* Water Resources Monograph 16: 143–159.
Verweji, Marco. 2000. Why Is the River Rhine Cleaner than the Great Lakes (Despite Looser Regulation)? *Law & Society Review* 34 (4): 1007–1054.
Vollmer, Ruth, Reza Ardakanian, Matt Hare, Jan Leentvaar, Charlotte van der Schaaf, and Lars Wirkus. 2008. *Institutional Capacity Development in Transboundary Water Management.* Paris: UNESCO.
Warner, Jeroen. 2006. More Sustainable Participation? Multi-Stakeholder Platforms for Integrated Resource Management. *International Journal for Water Resources Development* 22 (1): 15–35.
Warner, Jeroen, and Arwin van Buren. 2009. Multi-Stakeholder Learning and Fighting on the River Scheldt. *International Negotiation* 14 (2): 419–440.
Waterbury, John. 2002. *The Nile: National Determinants of Collective Action.* New Haven, CT: Yale University Press.
Wester, Philippus., Douglas J. Merrey, and Marna de Lange. 2003. Boundaries of Consent: Stakeholder Representation in River Basin Management in Mexico and South Africa. *World Development* 31 (5): 797–812.
Wester, Philippus, and Jeroen Warner. 2002. River Basin Management Reconsidered. In *Hydropolitics in the Developing World: A South African Perspective,* edited by Anthony Turton and Rolan Henwood, 61–72. Pretoria: African Water Issues Research Unit.
Wolf, Aaron T. 2007. Shared Waters: Conflict and Cooperation. *Annual Review of Environment and Resources* 32: 241–269.
———. 1997. International Water Conflict Resolution: Lessons from Comparative Analysis. *Water Resources Development* 13 (3): 361–363.
Wolf, Aaron T., Annika Kramer, Alexander Carius, and Geoffrey D. Dabelko. 2005. Managing Water Conflict and Cooperation. In *The State of the World 2005: Redefining Global Security,* 80–95. Washington, DC: The Worldwatch Institute.
Young, Oran R., ed. 1999. *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms.* Cambridge, MA: MIT Press.
Zeitoun, Mark, and J. A. Allan. 2008. Applying Hegemony and Power Theory to Transboundary Water Analysis. *Water Policy* 10 (2): 3–12.
Zeitoun, Mark, and Naho Mirumachi. 2008. Transboundary Water Interaction I: Reconsidering Conflict and Cooperation. *International Environmental Agreements* 8 (3): 297–316.