

The Transboundary Freshwater Dispute Database Project

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Introduction

It is increasingly acknowledged that water will be one of the most pressing environmental concerns of the next century. As global populations and economies continue to grow exponentially and as environmental change threatens the quantity and quality of fresh water resources, attention has recently focused on the state, management, and conflict potential of those waters which cross international boundaries. Approximately 261 international watersheds and an untold number of transboundary aquifers cover about one half of the land surface of the globe affecting 40 percent of its population (Wolf et al., 1999). These international waters are resources whose management is especially intricate: they ignore our political boundaries, they fluctuate in both space and time, they have multiple and conflicting demands on their use, and applicable international law is poorly-developed, often contradictory and difficult to enforce. Not surprisingly, water has exacerbated political tensions around the globe, most notably between Arabs and Israelis, Indians and Pakistanis, and all ten riparians of the Nile River.

The fortunate corollary of water as an inducement to conflict is that water, by its very nature, tends to induce even hostile co-riparians to cooperate even as disputes rage over other issues. Alam (1998) has appropriately termed this trait “water rationality.” In fact, the weight of historic evidence tends to favor water as a catalyst for cooperation: nations have signed 3,600 water-related treaties since AD 805, while, in the same period, there have been only seven minor international water-related skirmishes (each of which included other non-water issues) [Wolf, 1998]. The only “water war” between nations on record occurred over 4,500 years ago, between the city-states of Lagash and Umma in the Tigris-Euphrates basin (Cooper, 1983). Given this disproportionate evidence in favor of “hydro-cooperation,” the processes of conflict resolution and amelioration warrant more study, despite the growing prevalence of literature which focuses on the unlikely prospects of “water wars.” Three works give good empirical evidence against the “water wars” framework: Wolf (1998) uses historical, strategic, shared interest, and institutional resiliency evidence; Ohlsson (1999) develops a Social Resource Water Stress Index to show human response and resiliency to scarcity; and Toset and Petter

Gleditch (1999) examine the Correlates of War Dataset to show that water is not a significant correlate. In the face of this empirical evidence, it seems that the “water wars” argument would finally give way to “water reality.”

The Transboundary Freshwater Dispute Database

To aid in the assessment of the process of water conflict resolution, we have been working over the past five years to develop the Transboundary Freshwater Dispute Database, a project of the Oregon State University Department of Geosciences, in collaboration with the Northwest Alliance for Computational Science and Engineering. The address for the Database Project is <http://terra.geo.orst.edu/users/tfdd>.

Four separate sections of the Database will be integrated and uploaded on the World Wide Web by Summer 1999. These include:

- a searchable compilation of 150 water-related treaties and 39 US inter-state compacts, catalogued by basin, countries or states involved, date signed, treaty topic, allocations measure, conflict resolution mechanisms, and non-water linkages (see Figure 1 for a statistical overview and Figure 2 for the Database’s Query Form). [The UN Food and Agriculture Organization has identified more than 3,600 treaties relating to international water resources dating between AD 805 and 1984, the majority of which deal with some aspect of navigation. Since 1814, states have negotiated a smaller body of treaties which deal with non-navigational issues of water management, flood control, hydropower projects, or allocations for consumptive or non-consumptive uses in international basins. Our collection includes only those dating from 1870 and later which deal with water per se, excluding those which deal only with boundaries, navigation, or fishing rights. Mention should be made of the tremendous strides the UN Food and Agriculture Organization has made in collecting and cataloguing water-related treaties – much of this component could not have been accomplished without their collections. See especially UNFAO (1978, 1984)].

Table 1. Statistical Overview

Signatories Bilateral 124/145 (86%) Multilateral 21/145 (14%)	Information Sharing Yes 93/145 (64%) No/ Not Available 51/145 (36%)
Principal Focus Water Supply 53/145 (37%) Hydropower 57/145 (39%) Flood Control 13/145 (9%) Industrial Uses 9/145 (6%) Navigation 6/145 (4%) Pollution 6/145 (4%) Fishing 1/145 (<1%)	Water Allocation Equal Portions 15/145 (10%) Complex but Clear 39/145 (27%) Unclear 14/145 (10%) None/Not Available 77/145 (53%)
Monitoring Provided 78/145 (54%) No/Not Available 67/145 (46%)	Non-Water Linkages Money 44/145 (30%) Land 6/145 (4%) Political Concessions 2/145 (1%) Other Linkages 10/145 (7%) No Linkages 83/145 (57%)
Conflict Resolution Council 43/145 (30%) Other Government Unit 9/145 (6%) United Nations/Third Party 14/145 (10%) None/Not Available 79/145 (54%)	Unequal Power Relationship Yes 52/145 (36%) No/Unclear 93/145 (64%)
Enforcement Council 26/145 (18%) Force 2/145 (1%) Economic 1/145 (<1%) None/Not Available 116/145 (80%)	

Source: Hamner and Wolf, 1998.

- the full text of each treaty and compact;
- a digital map of the world’s 261 international watersheds (see Figure 3 for the map, and Figure 4 for how this spatial component would interact with a treaty search). (The updated register and digital map were largely supported by the Nippon Foundation, and undertaken under the auspices of IWRA’s Committee on International Collaboration, which is chaired by Asit K. Biswas.)
- an annotated bibliography of the state of the art of water conflict resolution, including approximately 1,000 entries. (This was compiled primarily by Heather Beach and Jesse Hamner as a component of Beach, et al., 2000.)

The Database Project includes three additional components which, over time, we hope to make available on the Web as well:

- detailed negotiating notes (primary or secondary) from fourteen detailed case-studies of water conflict resolution. These cases include nine watersheds (the Danube, Euphrates, Jordan, Ganges, Indus, Mekong, Nile, La Plata, and Salween); two sets of aquifer systems (US-Mexico shared systems and the West Bank Aquifers); two lake systems (the Aral Sea and the Great Lakes); and one engineering works (the Lesotho Highlands Project).

- news files on cases of acute water-related disputes;
- descriptions of indigenous/traditional methods of water dispute resolution

It is to be hoped that making this information widely available will aid in comparative assessments by both researchers and practitioners. We are utilizing the Web to encourage broad accessibility to the database. The Database is not copyrighted (although due credit is appreciated) and has generated five articles to date: Wolf (1997); Hamner and Wolf (1998); Wolf (1998); and Wolf et al., 1999.



Figure 1. Query form for the Transboundary Freshwater Dispute Database.

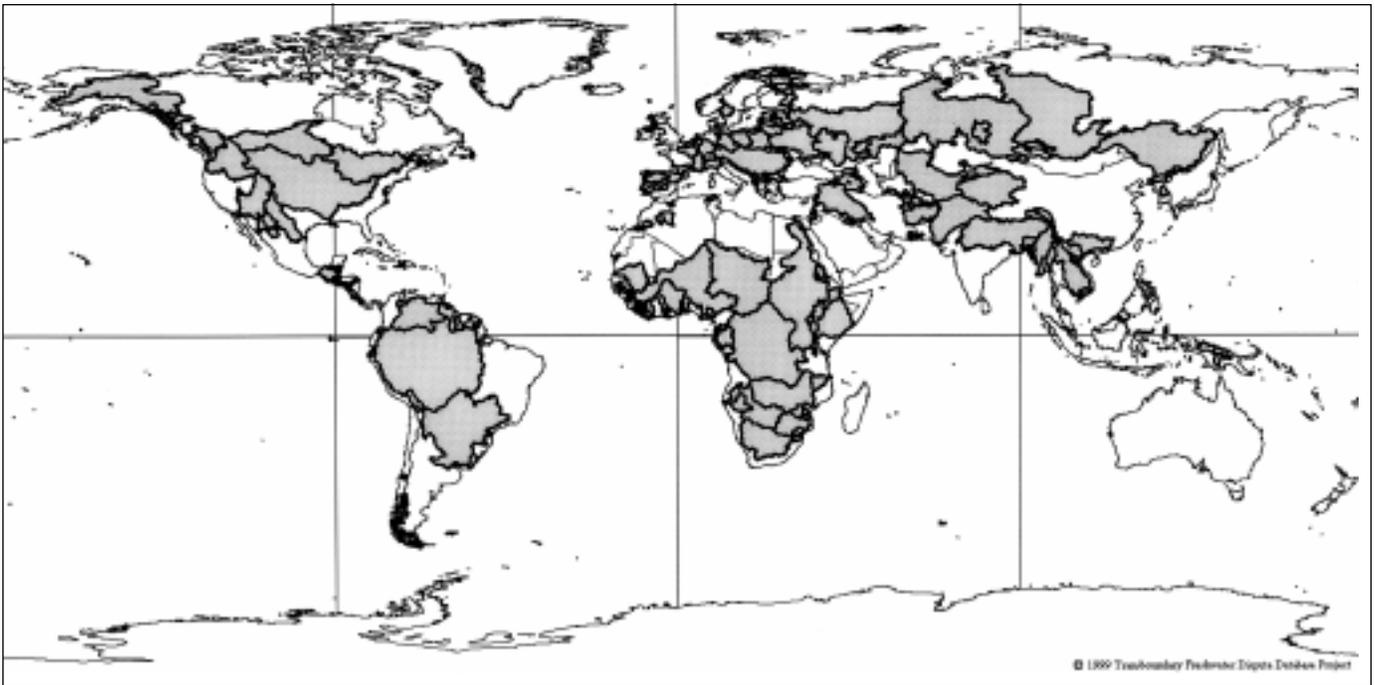


Figure 2. International basins: A digital map of the world's 261 international watersheds.

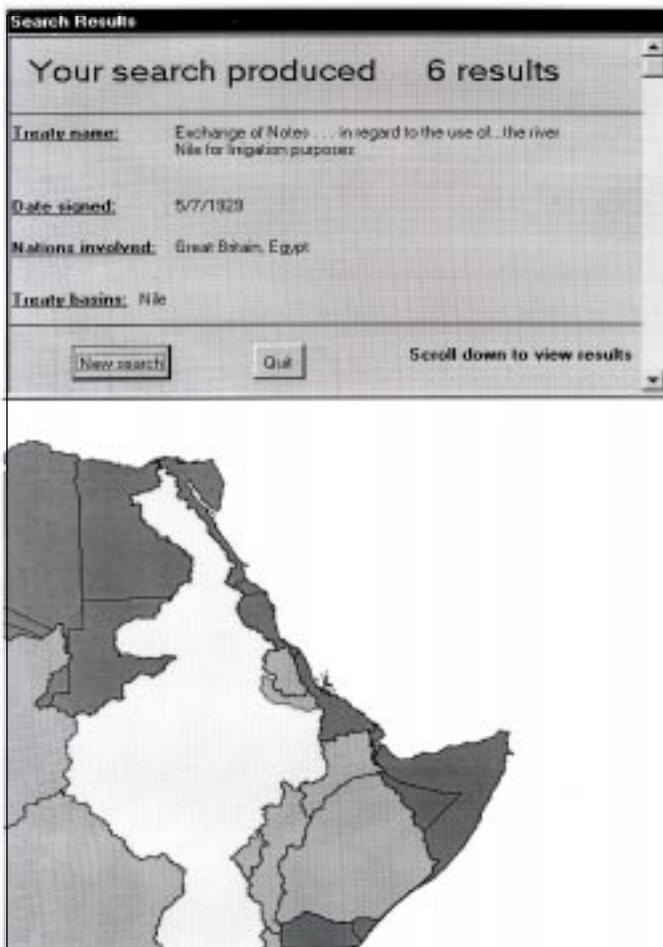


Figure 3. Spatial treaty search results.

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About the Author

Dr. Aaron T. Wolf is an Assistant Professor of Geography in the Department of Geosciences at Oregon State University. He has a M.S. in water resources management (emphasizing water science) and a Ph.D. in environmental policy analysis (emphasizing conflict resolution) from the University of Wisconsin, Madison. His research focuses on issues relating transboundary water resources to political conflict and cooperation, where his training com-

binning environmental science with dispute resolution theory and practice, have been particularly appropriate. He is Director of the Transboundary Freshwater Dispute Database project.

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