

**APPLYING THE CONCEPTS OF THE HYDROLOGIC
COMPLEX TO WATER RESOURCES MANAGEMENT
IN THE LOWER RIO GRANDE/DELTA**

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currently carried out, an array of actual and potential conflicts in the basin exists: between rural and urban uses, between economic development and preservation of environmental quality, between upstream and downstream locations and between the United States and Mexico. The current drought, now nearly a decade in length, has exacerbated growing tensions between competing water uses. Use of Rio Grande water has been pushed to the highest levels of the binational relations agenda of both the U.S. and Mexico.

Our analysis draws upon regime theory and the concept of a “hydro-political security complex” to explore water management and water security in the binational Lower Rio Grande/Río Bravo Basin. We use this conceptual framework to analyze the current water management context, examine vulnerabilities to the existing water regime, and consider possible ways in which the regime could be strengthened.

REGIME THEORY AND THE CONCEPT OF HYDROPOLITICAL SECURITY COMPLEX

Regime theory is based on the premise that self-governed “states” act to maximize their benefits based on their own interests. The interaction of multiple states can be characterized a strategic “game” in which each entity chooses its action based on the expected strategies of the other states. Such interactions are often presented as a Prisoner’s Dilemma game, which assumes that cooperation is not possible; hence each state independently chooses a non-cooperative but more costly (Pareto sub-optimal) security strategy. Yet in reality it is common for states to engage in a variety of cooperative interactions in areas such as defense, trade, and environment. The concept of a “regime” is useful in understanding such cooperative self-interested behavior of the state. As defined by Krasner (1983), a regime is a complex of “implicit or explicit principles, norms, rules, and decision-making procedures around which actors’ expectations converge in a given area of international relations.” Thus, regimes can encourage cooperation by institutionalizing interaction, increasing transparency, and defining and enforcing acceptable behavior. In effect, regimes lower the cost, risk and uncertainty of achieving security. Haftendorn (2000) applies the notion of regimes to the context of water, and defines water regimes as existing, “when the affected states ... observe a set of rules designed to reduce conflict caused by use, pollution or division of a water resource or the reduction of the standing costs and the observance over time of these rules.”

The related concept of a hydro-political security complex has recently emerged from a somewhat different body of thought in which national security concerns have expanded to include trans-boundary environmental issues. In general a security complex can be seen as a group of states “whose process of securitization, desecuritization, or both, are so interlinked that their security problems cannot be reasonably analyzed or resolved apart from one another” (Buzan et al., 1998). Schulz (1995) more specifically defines a hydro-political security complex as a set of states that are geographically part owners and technical users of a water body, and that consider that water body to be a major national security issue.

APPLICATION TO THE LOWER RIO GRANDE/RÍO BRAVO BASIN

Several recent case analyses have applied the notions of water regimes and the hydropolitical security complex to the Middle East and various regions in Africa (Schulz, 1995; Allan, 2001; Turton, 2001). Turton's (2001) work regarding water resources in the Orange River Basin of southern Africa provides a useful framework upon which much of our analysis is based. Building on recent research regarding the complex set of water issues faced by the Lower Rio Grande/Rio Bravo Basin (Schmandt et al., 2000; Aguilar et al., 2001; Mathis, in press), and the current binational dispute over shortfalls in water deliveries from Mexico, we develop the argument that the institutions involved in the management of water in the Lower Rio Grande/Río Bravo Basin constitute a water regime, and that the U.S. and Mexico perhaps

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the 1944 Treaty and the IBWC/CILA has supported cooperative binational water management while enhancing the security of supply for each country. However, as others (e.g. Mumme, 1999; Schmandt et al., 2000; Schmandt; 2002) have pointed out, the existing water regime is vulnerable in areas that include water quality, integrated watershed management, water issues related to sustaining the ecosystem, and drought planning. We discuss changes in the basin that may lead to reduced water security, such as more frequent violations of the 1944 Treaty, and consider the adaptability of the water regime in light of those changes.

REFERENCES

- Aguilar-Barajas, Ismael, 1999. "Interregional Transfer of Water in Northeastern Mexico: The Dispute over El Cuchillo." *Natural Resources Journal*, v.39, no.1, pp 65-98.
- Aguilar-Barajas, Ismael; Mathis, Mitchell; and Schmandt, Jurgen, 2001. "Water Security and Economic Development in the Binational Lower Rio Grande/Río Bravo Basin, USA/Mexico," in Report 9, Proceedings, Stockholm International Water Institute Seminar, Water Security for Cities, Food and Environment – Towards Catchment Hydrosolidarity, pp. 79-87.
- Allan, J. A., 2001, *The Middle East Water Question: Hydropolitics and the Global Economy*. I.B. Tauris, London.
- Buzan, B. and Wæver, O. 2000. *Security Complexes and Subcomplexes*. Lynne Rienner, London.
- Buzan, B.; Wæver, O.; and de Wilde, J., 1998. *Security: A New Framework for Analysis*. Lynne Rienner Publishers, London.
- Krasner, Stephen D., 1983. "Structural Causes and Regime Consequences: regimes as intervening variables," In *International Regimes*, edited by Stephen D. Krasner, Cornell University Press, Ithica.
- Haftendorn, H., 2000. "Water and International Conflict," *Third World Quarterly*, v. 21: 51-68.
- Mathis, Mitchell, in press. "Water in the Texas Lower Rio Grande Border Region: A Binational Perspective," in J. Norwine, ed., *Water for Texas: Beyond 2000*, Texas A&M Press, College Station, Texas.
- Mumme, Stephen, 1999. Managing Acute Water Scarcity on the U.S.-Mexico Border: Institutional Issues Raised by the 1990's Drought," *Natural Resources Journal*, v.39: 149-166.
- Schmandt, Jurgen, 2002. "Bi-National Water Issues in the Rio Grande/Río Bravo Basin," *Water Policy*, v. 4: 137-155.
- Schmandt, Jurgen.; Aguilar-Barajas, Ismael.; Mathis, Mitchell; Armstrong, Neal; Chapa-Alemán, Liliana; Contreras-Balderas, Salvador; Edwards, Robert; Hazleton, Jared; Na