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The Legal Dilemma of Groundwater under the Integrated Environmental Plan for the Mexican-United States Border Area.

M. Diane Barber

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THE LEGAL DILEMMA OF GROUNDWATER UNDER THE INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-UNITED STATES BORDER AREA

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I. INTRODUCTION

Six short years ago, the National Groundwater Policy Forum (Forum) declared the nation "fortunate" that groundwater contamination had not yet reached critical proportions.¹ The Forum called upon federal, state, and local governments to join with private industries and public interest groups to form an environmental partnership geared to comprehensive groundwater management. The Forum urged these entities to take immediate forceful action, through the enactment of state and federal laws, to maintain and protect this valuable natural resource.²

Lawmakers and the public at large failed to rally behind this cause, abandoning groundwater in this country to the patchwork purview of individual states. Arguably, such apparent laxity is not surprising based on the longstanding tendency of the legislative and judicial systems to overlook the relationship between surface waters and groundwaters. Although surface waters are subject to stringent controls, groundwaters, largely because they have been hydrologically misunderstood, have been recognized as incidental to ownership of property and, as such, have been only sporadically regulated per se.³ In the western states where water is crucial to economic stability, political concerns related to the regulation of underground water-pumping

1. THE NATIONAL GROUNDWATER POL'Y FORUM, FINAL REPORT, Groundwater Saving the Unseen Resource 8 (The Conservation Foundation 1987).

2. *Id.*; see also *id.* at 31-32.

3. New Mexico has historically recognized the relationship of groundwater to surface water. See generally Robert Emmet Clark, *New Mexico Water Law Since 1955*, 2 NAT. RESOURCES J. 484 (1962) (tracing history of New Mexico water law).

have exacerbated the sluggish approach of lawmakers to the protection of groundwaters.

Conversely, in nearby Mexico, groundwater has been directly addressed by the federal government and the citizenry. Mexico has carefully delineated groundwater jurisdiction and has provided what appears to be ample means of government regulation.

In the spring of 1992, the Integrated Environmental Plan for the Mexico-United States Border Area (Plan) was jointly issued by the Environmental Protection Agency of the United States (EPA) and the Secretaria de Desarrollo Urbano y Ecología (SEDUE).⁴ The Plan makes apparent that the "fortunate" condition of groundwater has changed dramatically in certain areas along the border,⁵ consistent with repeated warnings of a multitude of commentators.⁶ The Plan emphasizes the need for immediate monitoring of groundwater quality and proposes that solutions to problems be advanced under the existing legal framework.⁷ This legal framework must take cognizance of groundwater jurisdiction shared by the United States, the four border states, the EPA, the SEDUE, and Mexico's National Water Commission (CNA).⁸ The Plan further provides that the International Boundary and Water Commission (IBWC) shall be a vehicle for information-gathering.⁹ Apparently, resolutions are to be

4. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVTL. PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) (1992). An initial version of the Plan was issued in draft form on August 1, 1991.

5. See *id.* at VI-3 to VI-4 (1992) (noting past and current Border Area conditions).

6. See generally Harry W. Ayer & Paul G. Hoyt, *Industrial Growth in the U.S. Border Communities and Associated Water and Air Problems: An Economic Perspective*, 17 NAT. RESOURCES J. 585 (1977) (warning of potential problems); Edwin H. Carpenter & Larry G. Blackwood, *The Potential for Population Growth in U.S. Counties that Border Mexico: El Paso to San Diego*, 17 NAT. RESOURCES J. 545 (1977) (explaining effect of population growth on natural resources); Niles Henson, *Economic Growth Patterns in the Texas Borderlands*, 22 NAT. RESOURCES J. 805 (1982) (explaining how water availability will affect growth patterns); Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093 (1982) (noting potential problems with current treatment and status of groundwater).

7. See U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) A-6 to A-10 (1992) (outlining current agreements between the United States and Mexico).

8. *Id.* at V-12 (explaining role of each entity).

9. *Id.* at V-12 to V-13.

proposed under existing Mexican-United States agreements.¹⁰ Although the Plan makes general references to the Water Treaty of 1944, Minute 242, and the 1983 Border Environmental Agreement,¹¹ it is unclear as to the specific legal framework under which an entity should shape a proposal. Such vagueness and reliance on the IBWC may well be due to the lack of current treaty authority to engage in more than an exchange of groundwater information.

This paper will explore the dilemma of implementing an appropriate legal format which would best guide proposals for resolution of groundwater contamination. It will review groundwater under the Plan, examine groundwater law in Mexico and the four border states from a historical perspective, consider existing agreements between the two countries relative to groundwater, and propose the adoption of the Bellagio Draft Treaty as the only legally viable means of achieving the long-term remedial groundwater solutions necessary under the Plan. However, this paper will also note that isolated situations may be effectively addressed by the IBWC Minute, pending treaty negotiation. The paper will argue that judicial and legislative systems must recognize hydrological concepts that are fundamental to sound, efficient management of groundwater as a national resource, and will suggest that such an approach, when managed by the IBWC, will not create needless havoc with 1944 Water Treaty allotments. Finally, the paper will conclude that the Plan is a commendable, bi-national initial effort which addresses the delicate issue of managing transboundary aquifers.

The legal dilemma of overlapping jurisdictions, compounded by underlying conflicting socio-economic concerns which now entrap groundwater resolutions under the Plan, must be resolved by taking the next step: establishing a treaty between the United States and Mexico. To rely solely on existing agreements to avoid difficult political issues will result in a groundwater protection policy as effective as that of the historical reliance on good fortune.

10. *Id.* Although the original draft of the Plan specifically stated that existing United States-Mexican agreements should guide further action, the final version simply lists all legal agreements between Mexico and the United States without comment. *Id.* at Annex A.

11. U. S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-12, A-6 to A-7 (1992).

II. THE BORDER PLAN

A. Background

In the fall of 1990, amidst rising concern from legislators and the public that environmental issues were being left far behind in the haste to conclude a bilateral trade agreement on the "fast-track,"¹² Presidents George Bush and Carlos Salinas de Gortari met in Monterrey to issue a joint communiqué. It instructed the responsible environmental agency of the United States, the Environmental Protection Agency (EPA), and the responsible environmental agency of Mexico, the Secretaria de Desarrollo Urbano y Ecología (SEDUE), to prepare a comprehensive environmental plan which would "seek ways to improve coordination and cooperation, with a view to solving the problem of air, soil and water quality and hazardous waste."¹³ Pursuant to this command, the EPA and the SEDUE developed the Integrated Environmental Plan for the Mexico-U.S. Border Area (First Stage, 1992-1994).¹⁴ The Plan does not purport to examine the impact of

12. In 1985, Mexico and the United States signed a Statement of Intent to Negotiate a Framework of Principles and Procedures Regarding the Trade and Investment Relations Between the United Mexican States and the United States of America (Apr. 23, 1985, U.S.-Mex.). In 1987, a United States and a Mexican representative signed the Understanding Between the Government of the United States of America and the Government of the United Mexican States Concerning a Framework of Principles and Procedures for Consultations Regarding Trade and Investment Relations, Nov. 6, 1987, U.S.-Mex., 27 I.L.M. 439. On June 11, 1990, Presidents Bush and Salinas announced their intent to commence negotiations. See generally Guy C. Smith, *The United States-Mexico Framework Agreement: Implications for Bilateral Trade*, 20 LAW & POL'Y INT'L BUS. 655 (1989) (providing exhaustive treatment of Framework Agreement). The Omnibus Trade and Competitiveness Act of 1988, P.L. 100-418, 102 Stat. 1107 (1988), made the fast-track procedures contained in that act applicable to the Trade Act of 1974, 19 U.S.C. § 2110, and thereby to the free trade agreement.

13. See President George Bush & President Carlos Salinas de Gortari, Joint Communiqué (Nov. 27, 1990), reprinted in U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICO-U.S. BORDER AREA (FIRST STAGE, 1992-1994) I-1 (1992) (containing statement of Plan's goals). The text of the joint communiqué reads:

The Presidents emphasized the need for ongoing cooperation in the area of environmental protection. Both Presidents instructed the authorities responsible for environmental affairs of their countries to prepare a comprehensive plan designed to periodically examine ways and means to reinforce border cooperation in this regard, based on the 1983 Bilateral Agreement. Such a mechanism should seek ways to improve coordination and cooperation, with a view to solving the problems of air, soil and water quality and of hazardous wastes. State and municipal authorities of both governments and private organizations in both countries should participate in such tasks as appropriate. *Id.*

14. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICO-U.S. BORDER AREA

the free-trade agreement upon environmental conditions at the border.¹⁵ Rather, it limits itself to the directive of the communiqué, summarizing existing border problems categorically and creating generalized implementation plans.¹⁶ Indeed, the Plan seeks to solve Border Area pollution problems by strengthening “the basis for continuing cooperation between Mexico and the United States. . . .”¹⁷ Accordingly, the Plan couches problems within the existing environmental institutional framework.¹⁸ In the case of water, the Plan cites the Water Treaty of 1944,¹⁹ which gave rise to the highly successful International Boundary and Water Commission (IBWC),²⁰ and

(FIRST STAGE, 1992-1994) (1992) (presenting finalized version of original working draft issued Aug. 1, 1991).

15. The final version of the Plan contains a section entitled “North American Free Trade Agreement” in which it is stated that “to reduce or avoid potential adverse environmental impacts of the NAFTA” the parties will proceed in separate negotiations.

Such adverse impacts are:

(1) negotiation of provisions in the NAFTA to limit or avoid potential adverse impacts associated with liberalization of trade in goods and services, such as impacts relating to pesticides and toxins in products, and

(2) cooperative arrangements and agreements between SEDUE and EPA to deal with other environmental issues.

U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) I-5 (1992). It is further noted that regardless of the outcome of the NAFTA, the Plan will be pursued. *Id.* Additionally, an interagency task force coordinated by the Office of the United States Trade Representative with the assistance of the EPA released a draft analysis of the possible environmental effects of the NAFTA, the *NAFTA Environmental Review Document* in October 1991. *Id.* at I-56. The review emphasized the need for the successful implementation of the Mexican-U.S. Border Environmental Plan. *Id.*

16. The Plan categorizes Border Environmental conditions into: Water; Hazardous Materials and Hazardous and Municipal Solid Wastes; Pesticides; Contingency Planning-Emergency Response and Pollution Prevention. *Id.* at III-1 to III-28. The Implementation Plans are presented by geographic area for Water Quality, Hazardous Materials and Hazardous Wastes, Municipal Solid Waste and Air Quality. *Id.* at V-7 to V-43.

17. *Id.* at I-3. Further objectives of the plan are also noted. *See id.* (including goals of providing comprehensive plan, solving pollution problems, setting up system for periodic review, and encouraging government and private participation).

18. *See id.* at V-1 (referring to Agreement Between the United States and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area (1983 Border Environmental Agreement (La Paz Agreement)); *id.* at V-13 (noting agreement to develop programs under existing Mexican-United States agreements).

19. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande [1944 Water Treaty], Feb. 3, 1944, U.S.-Mex., art. 25, 59 Stat. 1219, T.S. 994 (effective Nov. 8, 1945). *See generally* Kirsten J. Anderson, Note, *A History and Interpretation of the Water Treaty of 1944*, 12 NAT. RESOURCES J. 600 (1972) (outlining treaty background and controversial provisions).

20. *See* Mark A. Sinclair, Note, *The Environmental Cooperation Agreement Between*

IBWC Minute No. 242,²¹ as the vehicles for exchange of information and consultation regarding border groundwater.²² The Border Area itself is defined as "an area 100 kilometers on each side of the international boundary."²³

B. *Groundwater in the Plan*

1. Examination of Groundwater

Water issues are addressed in "Water Supplies,"²⁴ "Water Quality,"²⁵ "Wastewater Treatment,"²⁶ and "Marine Environment,"²⁷ with groundwater addressed in the first three categories.²⁸ The thrust of the groundwater discussion is the mounting bi-national concern with the spread of contaminated waters:

In some regions of the Border Area, the waters that cross the boundary or those that drain into or from the international rivers present unsuitable sanitary conditions attributable to the disposal of wastewaters in those water courses. There is the related risk of pollution of trans-boundary groundwaters if proper management and treatment of waste-

Mexico and the United States: A Response to the Pollution Problems of the Borderlands, 19 CORNELL INT'L L.J. 87, 109-22 (1986) (reviewing development of IBWC under Water Treaty of 1944); see also Stephen P. Mumme & Scott T. Moore, *Agency Autonomy in Transboundary Resource Management: The United States Section of the International Boundary and Water Commission, United States and Mexico*, 30 NAT. RESOURCES J. 661, 663-76 (1990) (examining organizational politics under the IBWC); Peter S. Smedresman, Comment, *The International Joint Commission (United States-Canada) and the International Boundary and Water Commission (United States-Mexico): Potential for Environmental Control Along the Boundaries*, 6 N.Y.U. J. INT'L L. & POL. 499, 504-17 (1973) (critiquing Mexican-United States relationship under IBWC).

21. Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, IBWC Minute No. 242, Aug. 30, 1973, Mex.-U.S., 24 U.S.T. 1971.

22. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) VI-3 (1992).

23. *Id.* at I-I (1992) (defining "Border Area" in same way as La Paz Agreement).

24. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) III-1 to III-3 (1992).

25. *Id.* at III-3 to III-5.

26. *Id.* at III-5 to III-9. The Plan breaks down wastewater treatment by region: Tijuana-San Diego; Mexicali-Imperial County; Nogales-Nogales; Ciudad Juarez-El Paso; Nuevo Laredo-Laredo; Bajo Rio Bravo-Lower Rio Grande. *Id.*

27. *Id.* at III-9 to III-12.

28. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) III-2 to III-5 (1992).

water and hazardous wastes are not carried out. Mexico and the United States are concerned about the adverse public health and environmental impacts associated with pollution of transboundary water supplies.²⁹

The water discussion reveals worry for the Mesilla and Hueco aquifers in El Paso County, Texas. Both aquifers are pumped heavily and rely on recharge from the Rio Grande River and storage in the Rio Grande alluvium.³⁰ The report quietly notes: "The quality of the surface water in the Rio Bravo-Rio Grande and the quality of the groundwater in storage in the river alluvium can have a significant impact on the quality of the groundwater in the bolsons. . . ."³¹

The report then continues with three observations: (1) "the quantity of groundwater available for agricultural purposes throughout the Border Area could be adversely affected by significant industrial growth"; (2) "widespread industrial growth and associated residential development in close proximity to El Paso County could create high rates of groundwater withdrawal from the bolsons and result in unacceptable groundwater quality degradation"; and (3) "extensive groundwater pumping throughout the Border Area may lead to transboundary and surface subsidence problems."³²

2. Impact of Untreated Wastewater, Hazardous Waste, and Pesticides

The Plan names untreated wastewater, industrial wastes, and agricultural runoff, particularly in the Rio Grande region, as persistent border problems.³³ The Plan also describes the Rio Grande Valley and the Imperial Valley of California as major agricultural producing areas which use substantial quantities of pesticide on both sides of the border. This pesticide use is potentially a "non-point source pollution of water bodies."³⁴

29. *Id.* at III-3. The plan notes the recent rise of cholera in the Border Area. *Id.*

30. *Id.* at III-2.

31. *Id.*

32. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) III-3 (1992).

33. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) III-5 to III-9 (1992).

34. *Id.* at III-25. See generally *id.* at III (discussing pesticide use in Border Area).

Moreover, the Plan cites a remarkable increase in documented shipments of hazardous waste through Texas: from 9 shipments and 189.9 tons in 1987, to 356 shipments and 2388.5 tons in 1990.³⁵ The EPA and the SEDUE suspect illegal storage and dumping on both sides of the border, but they are uncertain as to the extent of such activity.³⁶ Both entities recognize that this flow of hazardous waste is a potential contaminant of surface water and groundwater.³⁷

3. Implementation Plan for Groundwater

Initially, both Mexico and the United States will monitor groundwater sources and collect data sufficient to identify problem areas.³⁸ The Plan anticipates that data-gathering would have taken place in 1992, and that problem areas would be located in 1993.³⁹ The Plan notes that the "first priority" is to identify contaminated and threatened aquifers.⁴⁰ Surface and groundwater supplies will be addressed in an integrated fashion. The SEDUE, the CNA, and the EPA through the IBWC will:

[develop] an inventory of the sources, quality, and treatment processes of the existing drinking water . . . determine the priority needs for water supply treatment and distribution systems for existing and future development in the sister city communities . . . exchange information on surface and groundwater protection programs . . . identify areas where any [drinking] water source is contaminated or where there is an identifiable threat of contamination [and] . . . develop cooperative programs for solving identified problems under existing Mexican-United States agreements.⁴¹

Additionally, the general implementation provisions for "Effective Protection of Transboundary Environmental Resources" states that

35. *Id.* at III-20. The Plan seems to indicate the directional flow of the waste transported is from Mexican maquiladora plants to United States plants. *Id.*

36. *See id.* at III-19 to III-23 (outlining concerns regarding contamination of Border Area water sources).

37. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) III-20 to III-23 (1992).

38. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-12 (1992).

39. *Id.*

40. *Id.*

41. *Id.* at V-13.

“policies to be applied for the protection of . . . transboundary aquifers” should have been announced by the IBWC in 1992.⁴² To date, however, the IBWC has issued no transboundary aquifer policy.⁴³

The Plan refers to existing Mexican-United States agreements, including the Water Treaty of 1944, the IBWC Minute No. 242, and the 1983 La Paz Agreement.⁴⁴ The 1992 data-gathering and the 1993 identification of problem areas provided for in the Plan⁴⁵ fall clearly within the mandate of Minute 242 which authorizes information exchange on groundwater.⁴⁶

As for the solutions to groundwater contamination, the Plan offers ten site-specific implementation frameworks for wastewater.⁴⁷ The Plan is silent, however, as to what format the countries should use to address other sources of contamination. The Plan merely states that “enforcement actions by the proper agencies in each country” may be undertaken, together with “international construction projects and other cooperative solutions and preventive measures.”⁴⁸ Left unanswered is the question of the actual mechanism by which to implement remediation efforts. Apparently, each government must work within the context of existing Mexican-United States agreements, and the proposed solutions must fit within the tangled jurisdiction of groundwater.

As the Plan notes:

The Governments of Mexico and the United States are concerned about

42. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-49 (1992).

43. Telephone interview with Manuel Ybarra, Secretary of the IBWC in El Paso, Tex. (Dec. 1992) (confirming that no policies issued thus far).

44. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) Annex A (1992).

45. *Id.* at V-30.

46. Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, IBWC Minute No. 242, Aug. 30, 1973, Mex.-U.S., 24 U.S.T. 1971. Minute 242, Section 6 provides:

With the objective of avoiding future problems, the United States and Mexico shall consult with each other prior to undertaking any new development of either the surface or the groundwater resources, or undertaking substantial modifications of present developments, in its own territory in the border area that might adversely affect the other country. *Id.*

47. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-14 to V-21 (1992).

48. *Id.* at V-12.

adverse impacts on public health and the environment in border regions where transboundary groundwaters may be contaminated or are threatened by contamination. There is no existing groundwater treaty between the two countries. . . . In the United States, EPA and the four United States border states share jurisdiction over border groundwater quality matters within their respective boundaries. In Mexico, SEDUE and the National Water Commission (CNA) have corresponding jurisdiction.⁴⁹

Herein lies the thorniest legal problem before the Mexican and United States governments. The governments must provide a framework for resolving groundwater contamination. Such a framework must be designed to consider the current sovereign rights over groundwater possessed by each border state. The approach of each border state varies because each state has adopted a legal doctrine which best suits its own socio-economic circumstances. Thus, four legal regimes, including California, Arizona, New Mexico, and Texas, now exist.

Although some aspects of groundwater have been regulated by federal statute incident to pollution control,⁵⁰ the reach of these statutes does not appear to provide the EPA with the necessary jurisdiction suggested by the Plan. Such jurisdiction must include authority to regulate pumping. Notwithstanding pollution-causation issues, it is unlimited pumping that exacerbates the groundwater-contamination problem. Pumping has traditionally been regulated within the statutory and common law framework of the individual states. Thus, without controlling federal legislation, jurisdiction of sovereign states must be built into transboundary aquifer resolutions.

Although this pieced jurisdiction appears to be in stark contrast to the entire cloth appearance of Mexican federal jurisdiction over water, government regulation of pumping may create novel water problems in Mexico. Mexico appears to be giving its border states more power to enforce environmental laws. As in the United States, the degree and type of enforcement may vary if left to state control. Enforcement problems could be further exacerbated if both Mexican

49. *Id.*

50. Eight federal statutes contain provisions to protect groundwater: Comprehensive Environmental Response, Compensation and Liability Act; Clean Water Act; Federal Insecticide, Fungicide and Rodenticide Act; Resource Conservation and Recovery Act; Safe Drinking Water Act; Surface Mining Control and Reclamation Act; Toxic Substances Control Act; Uranium Mill Tailings Radiation Control Act. Additionally, the Endangered Species Act impacts upon groundwater.

and United States border states perpetuate the legal mythology concerning groundwater by partitioning surface and groundwater through the application of legal terms derived from an age when underground water was considered a mysterious and perplexing natural phenomenon.⁵¹

C. *Hydrology and the Plan*

1. Mass Balance

Hydrologists define "mass balance" as "the idea that inputs to the hydrologic system from all sources are equal to outputs."⁵² Despite early efforts to separate surface and groundwater in a fumbling attempt to deal with its labyrinthal qualities, scientists now recognize that the interrelationship between surface water and groundwater is essential to groundwater management.⁵³

2. Hydrology in the Law

For the past sixty years, as water volumes have declined and pollution has remained uncontrolled, water law scholars have called for a more harmonized approach to groundwater management.⁵⁴ Yet, states cling to their historical doctrines, unwilling to consider what modern science has revealed. Modern science now recognizes that the mysterious nature of underground water is reducible in large part to maps, flow charts, and mathematical calculation. In short, hydrology has arrived.

In fairness to the legal systems, some scholars note that scientists themselves have been heretofore ineffective apostles of comprehensive water dogma.

Hydrology as a science has not been markedly successful in communi-

51. See George D. Cisneros, *Texas Underground Water Law: The Need for Conservation and Protection of a Limited Resource*, 11 TEX. TECH L. REV. 637, 639 (1980) (noting historical views of nature of underground water).

52. W.P. Balleau, *Water Appropriation and Transfer in a General Hydrogeologic System*, 28 NAT. RESOURCES J. 269, 270 n.1 (1988).

53. See Robert D. Hayton, *The Ground Water Legal Regime as Instrument of Policy Objectives and Management*, 22 NAT. RESOURCES J. 119, 119-24 (1982) (noting problems that developed due to misunderstanding of interrelationship between water sources).

54. See Frank J. Trelease, *Conjunctive Use of Groundwater and Surface Water*, 27 ROCKY MTN. MIN. L. INST. 1853, 1856 (1982) (urging harmonized approach); Samuel C. Weil, *Need of Unified Law for Surface and Underground Water*, 2 S. CAL. L. REV. 358, 369 (1929) (calling for attention by attorneys, engineers, legislators, and voters).

cating its basic principle, such as mass balance. A water policy study team advising the New Mexico legislature concluded that "this concept and its ultimate impact on the environment . . . is little understood by hydrologists and by people alike."⁵⁵

Notwithstanding the dawn of enlightened hydrology among scientists, the law has continued to (1) perpetuate antiquated myths of "underground streams," which are rarely actually found,⁵⁶ (2) characterize "percolating water" as separable and, therefore, treat it as a full sister to surface water, and (3) use the label "fugitive streams" as opposed to "underground streams."⁵⁷ Historically, such approaches, which may be generally summarized as giving water rights to the landowner or the first user, developed as a direct consequence of property rights. Today, however, the issue of property rights to water must be joined to the larger public interest in safe drinking water. Such waters face dissolution and contamination. Close examination of the origins of state laws reveals that such laws, although effective for over one hundred years, are inherently limited in approach and, thus, are ineffective in addressing groundwater issues. This fact does not indicate that property rights long-protected by the American legal system should be abandoned. Rather, this fact reveals that the larger public interest in water purity and availability should be integrated into existing legal regimes.

3. The Plan

Such considerations underlie the approach to groundwater contained in the Plan. The Plan's discussion of supplies of drinking water considers agricultural pumping needs, as well as industrial and municipal growth projections.⁵⁸ The groundwater implementation plan

55. W.P. Balleau, *Water Appropriation and Transfer in a General Hydrogeologic System*, 28 NAT. RESOURCES J. 269, 270 (1988) (commenting upon results of team study).

56. In Texas, such streams have never been found.

57. See Robert D. Hayton, *The Ground Water Legal Regime as Instrument of Policy Objectives and Management Requirements*, 22 NAT. RESOURCES J. 119, 122-28 (1982) (reviewing groundwater legal history); Samuel C. Weil, *Origin and Comparative Development of the Law of Watercourses in the Common Law and in the Civil Law*, 6 CALIF. L. REV. 245, 247 (1918) (describing judicial uncertainty regarding legal classification of water sources); Samuel C. Weil, *Theories of Water Law*, 27 HARV. L. REV. 530, 530 (1914) (noting existence of differing legal theories underlying water law).

58. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-1 to V-3 (1992).

specifically directs the United States and Mexico to take inventory of drinking-water sources, a mandate which would require a complete aquifer study.⁵⁹ This commendable integrated implementation plan will likely require a response, from each border state and Mexico, which will consider mass balance and drinking-water issues. Thus, the legal framework for solving groundwater contamination may force recalcitrant states to recognize hydrological principles.

D. *International Groundwater Law and the Plan*

1. Overview

For over twenty years, legal scholars have been warning the public of the looming environmental catastrophe if such voracious pumping on both sides of the Mexican-United States border were to continue.⁶⁰ As Professor Utton has remarked:

. . . significant population increases are projected on both sides of the border, making it reasonable to anticipate that there will be increasing pumping and accelerating demand placed on groundwater resources bisected by the international boundary between the two countries. This increased demand, combined with a striking absence of institutions for either resolving disputes or managing the resource, raises the specter of

59. *Id.* at V-12 to V-13.

60. See Neal E. Armstrong, *Anticipating Transboundary Water Needs and Issues in the Mexico-United States Border Region in the Rio Grande Basin*, 22 NAT. RESOURCES J. 877, 877-906 (1979) (forecasting water needs in Rio Grande Basin); Michael D. Bradley & Kenneth J. DeCook, *Ground Water Occurrence and Utilization in the Arizona-Sonora Border Region*, 18 NAT. RESOURCES J. 29, 29-32 (1978) (considering water quality concerns along Arizona-Sonora border); Barbara G. Burman & Thomas G. Cornish, *Needed: A Ground-Water Treaty Between the United States and Mexico*, 15 NAT. RESOURCES J. 385, 403-04 (1975) (calling for cooperative solutions to preserve accessible water); J.C. Day, *International Aquifer Management: The Hueco Bolson on the Rio Grande River*, 18 NAT. RESOURCES J. 163, 177 (1978) (warning that long-term availability of high-quality water from Rio Grande threatened by unsound management system); Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwater: New Resources Versus Old Dilemmas*, 12 CASE WES. RES. J. INT'L L. 505, 515 (1980) (outlining concerns about IBWC's present mandate); Ernest T. Smerdon, *Water—Its Role from Now to the Year 2000*, 22 NAT. RESOURCES J. 907, 909 (1982) (emphasizing importance of water quality and availability to transboundary region of Mexico and United States); Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1104 (1982) (examining potential problems with surface water apportionment and quality, groundwater quantity and quality, and possible conservation strategies); Albert E. Utton, *International Ground Water Management: The Case of the U.S.-Mexican Frontier*, 57 NEB. L. REV. 633, 649 (1978) (expressing concern for groundwater use in states contiguous to Mexico).

dispute between the two countries.⁶¹

The anticipated free-trade agreement will indubitably increase development in the Border Area, placing further pressure on a situation described as tenuous over ten years ago.⁶² Moreover, the critical water pollution problems described in the Border Plan sharpen health concerns over drinking water and socio-economic issues. Water-law scholars have suggested various legal regimes to manage the groundwater resource.⁶³ Mexican commentators have favored using the IBWC to approach the problem, but have not elaborated as to which legal theory should be followed.⁶⁴ These commentators have also failed to indicate whether Mexico and the United States would more comfortably address particular solutions for segregated areas rather than a generalized solution for the entire region.

2. Application of International Groundwater Law

With the laudable exception of New Mexico, legislators and the judiciary have failed to integrate surface and groundwater. This failure is equally apparent in international groundwater law. As an outgrowth of the world-wide focus on environmental problems, the relationship between the waters is being recognized gradually.⁶⁵ One commentator who has been frequently cited for his statement on the dearth of domestic groundwater statutes has noted that "legislative attention to the physical relationship between surface and ground-

61. Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1107 (1982).

62. See *id.* (noting potential for serious water problems in Border Area).

63. See Robert D. Hayton & Albert E. Utton, *Transboundary Groundwater: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 664-65 (1989) (presenting framework for groundwater management).

64. See Edmundo Victoria Mascorra, *Experiencia en el Manejo de Recursos de Agua Compartidos Entre México y Estados Unidos: Problemas, Oportunidades y Recomendaciones Para El Futuro*, 22 NAT. RESOURCES J. 1119, 1120 (1982) (suggesting that IBWC manage groundwater problems); César Sepulveda, *Instituciones Para La Solucion de Problemas de Aguas de Superficie Entre México y los Estados Unidos*, 18 NAT. RESOURCES J. 131, 139-40 (1978) (analyzing feasibility of IBWC'S ability to propose and enact solutions to United States-Mexico border water problems); César Sepulveda, *Implications for the Future: Design of Viable International Institutions*, 15 NAT. RESOURCES J. 215, 220 (1975) (explaining that IBWC could be strengthened to better manage international waters).

65. See Ludwik A. Teclaff & Eileen Teclaff, *Transboundary Ground Water Pollution: Survey and Trends in Treaty Law*, 19 NAT. RESOURCES J. 629, 632 (1979) (discussing relationship and differences between ground and surface water pollution).

water sources is scarcely older than the concern for pollution.”⁶⁶ This statement is equally applicable to the lack of common law and, accordingly, international law that recognizes the natural interdependence between surface water and groundwater.⁶⁷ Reliance upon international groundwater law to resolve the major problems of pollution and scarcity, as recognized in the Plan, is cumbersome at best and fruitless at worst, given the formulative stage of the law’s development.⁶⁸

III. GROUNDWATER LAW IN THE SOUTHWEST

A. *Historical Perspective*

1. Native American Custom

The true natives of the border region revered water as crucial to life. These early Native American tribes paid homage to deities such as rain gods, rain lords, or rain magicians.⁶⁹ The great explorer, Francisco Vasquez de Coronado noted in his diary in 1540:

So far as I can find out, these Indians worship water, because they say it makes their maize grow and sustains their life and the only other reason they know is that their ancestors did the same.⁷⁰

Because of the pivotal role of water and rain in the lives of the Native Americans and the sparse archaeological record, historians suggest that water was not considered private property and that water disputes were likely tribal or communal rather than individual.⁷¹ In-

66. R. Clark, *Western Ground-Water Law*, 5 WATERS AND WASTE RIGHTS, § 440 at 411 (1972).

67. See Ludwik A. Teclaff, *Fiat or Custom: The Checkered Development of International Water Law*, 31 NAT. RESOURCES J. 45, 69 (1991) (commenting on relationship between surface and groundwater). Professor Teclaff observes, “[t]he Helsinki Rules also implied, though they did not specifically state, that groundwater and estuarine waters, as well as surface waters, were interconnected through cause and effect and thus formed the basis for a holistic approach in law and management of the aquatic environment. *Id.*

68. See Julio Barberis, *The Development of International Law of Transboundary Groundwater*, 31 NAT. RESOURCES J. 167, 169 (1991) (providing recent review of international groundwater law).

69. MICHAEL C. MEYER, WATER IN THE HISPANIC SOUTHWEST 11 (1984).

70. *Id.* at 10 n.6 (quoting de Coronado as noted in HERBERT E. BOLTON, CORONADO: KNIGHT OF PUEBLO AND PLAINS 131 (1964)).

71. See *id.* at 18 (noting tribal views of water). The Aztecs did not allow individual control of land or water, merely their use. *Id.* at 18 n.26 (citing CARLOS H. ALBA, ESTUDIO COMPARADO ENTRE EL DERECHO AZTECO Y EL DERECHO POSITIVO MEXICANO 40-41 (1944)).

deed, most Native American religions followed the view that they were part of the natural ecological balance and, as such, were to use what was necessary to sustain life.⁷²

The God of Rain, or Lord of the Waters, named *Tlaloc*, *Cocijo*, *Tajin*, *Siiwani*, *Thunderbird*, *Tan-yi-ojua*, *Tzitz-cha-yan*, or *Chaac*, depending upon the tribe, was displaced with the arrival of the Spaniards and accompanying missionaries.⁷³ As the conquering Spanish directed the ancient flows of Native American rivers with European irrigation methods, the natives found that their code of unwritten laws of reverence for waters had vanished. Suddenly, water was distributed, and not to everyone. Indigenous Americans became supplicants in the legal system of a far-away culture, a culture which had clearly recognized the power to control water.⁷⁴

2. The Law of New Spain

a. Origins

The northern frontier of New Spain encompassed more than 960,000 square miles, roughly all the area covered by the Border Plan.⁷⁵ To control water issues, the Spaniards applied *Las Siete Partidas*, a civil code compiled in 1265 under King Alfonso V.⁷⁶ The *Partidas* code was derived from Roman law, although Moorish custom influenced its development.⁷⁷

Roman law shared the Native American belief that running water was not the property of the individual.⁷⁸ By natural law, these elements are common to all—the air, running water, the sea, and, consequently, the seashore.⁷⁹ “Res communes,” which belonged to no one

72. *Id.* at 19.

73. MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 9-10 (1984).

74. *Id.*; *see id.* at 3-104 (explaining relationship of water to society).

75. MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 3 (1984) (describing boundaries of New Spain).

76. *LAS SIETE PARTIDAS DEL REY DON ALFONSO EL SABIO* (1789) (consisting of four volumes).

77. *See* BETTY DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 63-77 (1959) (discussing water law and institutions of Spain).

78. *See* Samuel C. Weil, *Theories of Water Law*, 27 *HARV. L. REV.* 530, 530-40 (1917) (presenting thorough history of water law ownership principle commonly referred to as “first elemental principle”). *See generally* Samuel C. Weil, *Origin and Comparative Development of the Law of Watercourses in the Common Law and in the Civil Law*, 6 *CALIF. L. REV.* 245 (1918) (setting forth historical theories of water law).

79. Harbert Davenport and J.T. Cerales, *The Texas Law of Flowing Waters*, 8 *BAYLOR L.*

person, included fish, wild beasts, and the light and heat of the sun, as well as running water. Running water was:

so classed because at one instant it is in one place in the river, then it is gone and some other water has succeeded it, without anyone having been able to say that he had it as his own; a thing of continual motion and ceaseless change, not susceptible of exclusive possession, nor hence, of ownership.⁸⁰

The Romans then distinguished a right to water use which was recognized by civil law as a property right.⁸¹

The *Partidas* adopted the code of divisible things from the Romans and accepted the concept that some things belonged to no person.⁸² Included in this category were the air, rain, water, sea, and shores.⁸³ The *Partidas* further provided a groundwater provision that permitted a landowner to dig a well or spring, even if this action reduced the flow of a neighbor's well or spring.⁸⁴

The *Partidas* code was supplemented in 1681 by the *Recopilación de*

REV. 138, 160 (1956) (citing Book II, Title I of the INSTITUTES OF JUSTINIAN: OF THE DIFFERENT KIND OF THINGS).

80. *Id.* at 159 (quoting SAMUEL C. WEIL, *WATERS IN THE WESTERN STATES* 748-50 (3d ed. 1911)). As declared by the Romans:

. . . now let us proceed to the law of things. Of these, some admit of private ownership, while others it is held, cannot belong to individuals: for some things are by natural law common to all, some are public, some belong to a society or corporation, and some belong to no one.

Things become the private property of individuals in many ways; for the titles by which we acquire ownership in them are some of them titles of natural law, which, as we said, is called the law of nations, while some are titles of civil law. It will thus be most convenient to take the older law first: and natural law is clearly the older, having been instituted by nature at the first origin of mankind, whereas civil laws first came into existence when states begin to be founded, magistrates to be created, and laws to be written.

Id. at 160.

81. See BETTY E. DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 51 (1959) (citing Roman law). Ms. Dobkins quotes Samuel C. Weil, as follows:

The water in the stream — in the natural resource — itself is nobody's property or "belongs to the public." The right may exist in one having a right of access to it to take of it or otherwise use it (called usufructuary) and to have it flow to him for his use. Any part taken in the fulfillment of this usufructuary right is the private property of the taker while in his possession.

Id.

82. Partida 3, Título 28, Ley 2.

83. *Id.* Ley 3.

84. See BETTY E. DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 77 (1959) (noting *Partidas* provisions).

Leyes de los Reynos de las Indias.⁸⁵ This set of laws was followed by a compilation of laws and commentary, completed in 1805, entitled *Novísima Recopilación de las Leyes de España*.⁸⁶ At the end of the colonial era, Spain recognized this compilation as its basic source of law.⁸⁷ To these compilations, water scholars add three more documents to complete the history of Spanish colonial water law: the *Reglamento General de las Medidas de las Aguas* of 1761 (Regulations for Water Measurement), the detailed instructions on implementation of water law and resolution of disputes given to judicial officials in 1786, and the *Plan de Pitic*, the town plan of Hermsillo, whose water provisions were to be enforced throughout the internal provinces.⁸⁸

Additionally, local laws and customs influenced water law.⁸⁹ At least one scholar suggests that local water laws and customs were derived from the Moorish influence on the Spaniards, resulting in the colonial concept that water belonged to the pueblo community.⁹⁰

b. Land-Water Rights in New Spain

In New Spain, the king or other properly designated authority delegated water rights. Land grants may or may not have included the additional grant of water rights,⁹¹ and land was classified and valued dependent upon such rights.⁹² A grant of land with river frontage

85. See RECOPIACIÓN DE LEYES DE LOS REYNOS DE LAS INDIAS (Biox ed., 5th ed. 1841) (containing updated version in 4 volumes).

86. NOVÍSIMA RECOPIACIÓN DE LAS LEYES DE ESPAÑA (1805).

87. MICHAEL C. MEYER, WATER IN THE HISPANIC SOUTHWEST 111 (1984). The author also notes that some legal historians disagree as to its application to the Spanish empire in America. *Id.*

88. *Id.* at 112 (listing three important documents of Spanish water law).

89. See *id.* at 112-113 (discussing importance of local legislation); see also BETTY DOBKINS, THE SPANISH ELEMENT IN TEXAS WATER LAW 81 (1959) (observing use of local law and customs). Frederic Hall's work *The Laws of Mexico* quotes extensively from the scholar Joaquin Esriche y Martin, author of *Diccionario Razonado de Legislacion y Jurisprudencia* (1831). Hall's work, including Esriche's treatment of water law, is often quoted in cases, especially in Texas. See BETTY DOBKINS, THE SPANISH ELEMENT IN TEXAS WATER LAW 77-84 (1959) (discussing Esriche's interpretation of Spanish water law).

90. See BETTY DOBKINS, THE SPANISH ELEMENT IN TEXAS WATER LAW 83 (1959) (discussing the impact of the Moors).

91. See BETTY DOBKINS, THE SPANISH ELEMENT IN TEXAS WATER LAW 130 (1959) (discussing whether water rights were included in land grant); cf. MICHAEL C. MEYER, WATER IN THE HISPANIC SOUTHWEST 126-27 (1984) (stating that certain lands did not carry with them implied grant of water).

92. MICHAEL C. MEYER, WATER IN THE HISPANIC SOUTHWEST 122-26 (1984) (listing examples of classifications of land depending on water rights granted).

gave the owner use for domestic purposes only.⁹³ Springs or wells belonged to the property-owner.⁹⁴ Determining whether a grant of land over subsurface water also included a grant of the water was more difficult. One commentator explains this difficulty as follows:

The district ownership pattern between surface and subsurface water is not easy to explain. Water originating from rain was considered common property, but knowledge of aquifers was very rudimentary. Maybe the water in springs and wells came from subterranean sources; maybe it had always been there; the supply certainly seemed limitless. There was little or no appreciation that underground water also originated from precipitation, or that depleting an underground reserve on a given piece of property could have a direct impact on the water supply of a neighbor. Given this imperfect understanding, a person could pump water from a well or channel springwater to his fields without special permission. The only limitation on the use of water originating on private property was that it could not be used maliciously simply to deny its access to a neighbor.⁹⁵

c. Ownership of Water Rights

The Crown could grant water rights. However, such rights were often acquired through the administrator of the legal system, by use of *composición*⁹⁶ or *repartimento*.⁹⁷ This latter method, although apparently intended to protect the Native American population,⁹⁸ was

93. *Id.* at 120 (allowing Crown to dispose of water right at will).

94. *Id.*

95. *Id.* at 120 n.23 (citing Partida 3, Título 32, Ley 19). Meyer observes that: "In 1674 French scientist Pierre Perrault established that springs were fed by earthly precipitation, not by some wondrous subterranean source, but the discovery never quite caught up with Spanish jurisprudence." *Id.* at 120 n.22.

96. MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 134-35 (1984). *Composición* was a judicial method used to examine claims and render clear titles. As noted:

The *composición* was an important legal mechanism which helped water users whose legitimate rights were called into question because of the failure to meet some insignificant legal technicality. But they were also a source of abuse as they could be used by the affluent and affluent to blur distinctions between crop land and grazing land and to convey water rights for purposes not originally intended.

Id.

97. *Id.* at 135-36.

98. Concern for Indian rights in peninsular Spain prompted the *Audiencia*, the governing body of Spain to amend the *Recopilación* to require that waters of estates were to be common to Indians and Spaniards; eight years later this was broadened to provide that "waters" of the provinces "be common to all citizens." The concern stemmed from the Crown's grant to Hernn Cortes, the conqueror of Mexico, of large pieces of land, including rights "to running,

used in all water disputes as the basis for dividing available water. The *Recopilación* stated: "We decree that the audiences name judges . . . who shall apportion waters to the Indians for the irrigation of their farms, orchards, and cultivated fields, and to water their cattle, in such a way as to offend no one."⁹⁹

The apportioned rights to the water were not permanent and frequently were readjudicated, but failure to abide by a decision resulted in penalties, fines, or a loss of water rights.¹⁰⁰ Rivers became common property until they were privatized by grant, *composición*, or *recopilación*. Such rights were subject to sale. The result was the growth of *sobrante* rights, which were contracts between individuals for the primary owner's excess water. This permitted sales of *sobras*, often unwritten agreements between neighbors that were recognized and protected by local judicial authorities. Usage of the water established the relationship between primary and *sobrante* rights.¹⁰¹

Scholars disagree over whether Native Americans received different water rights or different treatment under the Spanish legal system.¹⁰² In the *Recopilación* and aforementioned relevant documents, the repeated stipulation that Native Americans not be denied water use may be viewed as further attempts by fair-minded persons to apply the long-standing water principle of Spanish law, that all have the right to use the river.¹⁰³

When title was unclear, the doctrine of prior use or prior appropriation was applied. This concept was applied tentatively, however, particularly when water was scarce. As Esriche noted in his *Diccionario*:

stagnant and percolating waters." This occurred at the height of public outcry in Spain over the possible mistreatment and enslavement of Indians in the New World. See *In re Adjudication of Waters Rights*, 670 S.W.2d 250, 252-53 (Tex. 1984) (using *Recopilación de Las Leyes de Las Indias* to determine Mexican law); see also *State of Texas v. Valmont Plantations*, 346 S.W.2d 502, 589 (1963) (discussing history of Mexican water law).

99. *Recopilación*, Libro IV, Título 17, Ley 5.

100. MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 136 (1984).

101. See *id.* at 140 (discussing nature of *sobrante* rights). "*Sobrante* rights were so thoroughly ingrained in the Spanish colonial and Mexican judicial systems that the concept was adopted by United States courts and applied to water disputes in those territories ceded to the United States at the end of the Mexican War." *Id.*

102. See BETTY DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 93 (1959) (discussing difference between Spanish and Native American systems of landholding); cf. MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 140-44 & n.48 (describing view of Mexican scholars).

103. *Id.* at 140-44.

Use is the custom, general practice, or *modus operandi* that has been imperceptibly introduced and has acquired the force of law. Prior use is founded on the tacit consent of the public that observes it, of the courts that conform to it, and the legislator that permits its application. . . . Prior use contrary to reason or to good custom can never acquire the force of law, because in such a case it can be considered no more than an old mistake, being less a use than an abuse and an infraction of the law.¹⁰⁴

Despite recognizing individual water rights, the colonial legal system elevated communal water rights and rescinded individual water rights if it was in the best interests of the pueblo.¹⁰⁵ As Betty Dobkins notes:

It is important in considering the Spanish system to bear in mind that its primary concern was with the common use of waters, with their administration in such a fashion that the community interests were served and the fertility of the land preserved, rather than with prior and exclusive rights.¹⁰⁶

The judges were encouraged by legal documents,¹⁰⁷ many governors,¹⁰⁸ as well as by the ancient tenet of water for all, to apply the doctrine of equity and common good. Although the interpretation of statutes and legal documents was central to the Spanish system, the judicial function, which included recognition of custom, permitted the balancing of interests fundamental to equity.¹⁰⁹ Despite the elaborate trappings of a civil law system, the fundamental principle of "water

104. MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 150 (1984) (citing *ESRICHE, DICCIONARIO RAZONADO DE LEGISLACIÓN* 686).

105. *See id.* at 156-57 (illustrating that the community rights outweighed individual rights); *see also* BETTY DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 98-101 (1959) (discussing the superiority of common water rights).

106. BETTY DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 98 (1959).

107. "The Plan of Pitic based its entire water distribution formula on the principles of 'equity and justice.'" MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST* 163 (1984) (citing *Plan de Pitic*, article 20, AGN, Tierras, vol. 2773, Exp. 22).

108. *Id.* at 162-63 (discussing governor of New Mexico's ordered equitable water distribution).

109. *See id.* at 161-63 (citing examples of litigants who had legal right to water but compromises were worked out permitting all parties some relief). This approach followed the Roman system of water law, whereby rights were protected but needs were addressed. *See* BETTY DOBKINS, *THE SPANISH ELEMENT IN TEXAS WATER LAW* 56-57 (1959) (showing Roman law contributions to modern water law); Samuel C. Weil, *Origin and Comparative Development of the Law of Water Courses in the Common Law and in the Civil Law*, 6 CAL. L. REV. 245, 254-55 (1918) (discussing interpretation of Roman doctrines).

for all," which dates back to early civilizations, was to be applied in a just fashion, overriding notions of rights inherent in property ownership.

B. *Groundwater Law in Mexico Today*

1. Constitution

Having established independence from Spain in 1821, New Spain endured nearly a century of changes in government and boundaries.¹¹⁰ Throughout this period, however, the basic approach to water rights did not change. Indeed, following the last revolution, the Constitution embodied the concept of the commonality of water and the attendant need to subjugate property rights to accommodate that need. Article 27 provides: "Ownership of the lands and waters within the boundaries of the national territory is vested originally in the Nation, which has had, and has, the right to transfer title thereof to private persons, thereby constituting private property."¹¹¹ This right of private ownership is, however, subject to limitation by the federal government.

The Nation shall at all times have the right to impose on private property limitations as the public interest may demand, as well as the right to regulate the utilization of natural resources which are susceptible to a more equitable distribution of public wealth, to attain a well-balanced development of the country and improvement of the living conditions of the rural and urban population.¹¹²

As to underground water, the Constitution further specifically provides:

Underground waters may be brought to the surface by artificial works and utilized by the surface owner, but if the public interest so requires or use by others is affected, the Federal Executive may regulate its extraction and utilization, and even establish prohibited areas, the same as may be done with other waters in the public domain.¹¹³

110. See generally T.R. FEHRENBACH, *FIRE AND BLOOD: A HISTORY OF MEXICO* (1973) (presenting Mexico's historical background); J. PATRICK MCHENRY, *SHORT HISTORY OF MEXICO* (1962) (noting changes in Mexican government and its form).

111. MEX. CONST. art. 27. (amended 1983).

112. *Id.* art. 27, § 3 (amended 1983).

113. *Id.* art. 27, § 5. Article 27, Section 5 amended in April 21, 1945 and January 20, 1960 by decrees published in the *Diario Oficial* (D.O.).

2. Water Statutes

Pursuant to Article 27, in 1934 Mexico passed the National Water Act (*La Ley Federal de Aguas*) which specifies priorities for water utilization.¹¹⁴ The subsequent Health Engineering Act of 1947 placed water-delivery systems within the exclusive power of the federal government.¹¹⁵ The Law of Conservation and Groundwaters of 1956 (*La Ley de Conservación del Suelo y Agua*) “established a system of restricted zones and a permit system to regulate the development of groundwaters.”¹¹⁶

The Secretariat of Agriculture and Water Resources (SARH) functions as the central administrator of water resources,¹¹⁷ and regulates groundwater operation of filter works, waterways, and irrigation systems. The SARH has the authority to establish prohibited groundwater zones to protect existing groundwater zones or aquifers if it finds that such measures are in the public interest.¹¹⁸ In so doing, the SARH must follow the order of priorities for water set by the Federal Executive. Nine uses are listed, with first priority given to domestic use, consistent with the federal law of water.¹¹⁹ These uses also explicitly recognize the right of the state and communities to private property rights.¹²⁰ This insistent recognition by Mexico’s federal government of the historical, national character of water and equitable water rights, has resulted in a flexible management system of water resources, subject always to the imperative that planning and development be “*sujeta los intereses superiores de la nación*” (subject to the

114. See Stephen P. Mumme, *The U.S.-Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT’L L. 505, 518 (1980) (explaining Mexican constitutional provision).

115. *Id.*

116. *Id.* Although currently limited, this water managed system may be expanded consistent with national policy objectives. *Id.*

117. See Francisco Oyarzabal, *Comentarios a las Leyes e Instituciones Que Reglamentan Las Aguas Superficiales de Mexico*, 22 NAT. RESOURCES J. 999, 1005 (1982) (explaining structure of Mexican institutions).

118. Albert E. Utton, *International Groundwater Management: The Case of the U.S.-Mexican Frontier*, 57 NEB. L. REV. 633, 634 (1978); see Barbara G. Burman & Thomas G. Cornish, *Needed: A Groundwater Treaty Between the United States and Mexico*, 15 NAT. RESOURCES J. 385, 392 (1975) (listing purposes of SARH).

119. Francisco Oyarzabal, *Comentarios a las Leyes e Instituciones Que Reglamentan Las Aguas Superficiales de Mexico*, 22 NAT. RESOURCES J. 999, 1002 (1982).

120. Oyarzabal lists the fourth priority as: “*Riego de terrenos; y dentro de éste es prioritario el ejido y terrenos comunales sobre la propiedad privada.*” *Id.*

best interests of the nation).¹²¹

Thus, the government has been acutely aware of the importance of both surface water and groundwater to the people and the economy. In the 1970s, the SARH undertook examinations of groundwater hydrology in Mexico, with emphasis on the border states, in an attempt to take inventory of sources and increase exploratory activities.¹²² As Mumme pointed out over a decade ago:

The importance of groundwater to the Mexican border economy, particularly agriculture, and the concomitant importance of the regional economy to the Mexican nation at large, suggest that the strategic significance of the development of groundwater resources in the area may loom much larger from the Mexican perspective than from that of the United States. That this is the case is evident in the recent large scale pumping programs initiated by the Mexican government in the region. . . . The evidence suggests the Mexican planners, endowed with the legal and administrative resources to pursue a rational strategy of groundwater development, will seek to take full advantage of the resource to promote the economic strength and growth of their border economy.¹²³

The majority of commentators concur that groundwater management is firmly in the control of the Mexican government.¹²⁴ More impor-

121. *Id.* at 1004.

122. See Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 520 (1980) (noting past action of SARH).

123. *Id.* at 519-20.

124. See Barbara G. Burman & Thomas G. Cornish, *Needed: A Groundwater Treaty Between the United States and Mexico*, 15 NAT. RESOURCES J. 385, 385 (1985) (noting that Mexico alone cannot solve groundwater problems); Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 518 (1980) (commenting on Mexican government's authority); Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1107 (1982) (noting that Mexico has authority to control groundwater withdrawals). *But see* Robert D. Hayton, *Institutional Alternatives for Mexico-U.S. Groundwater Management*, 18 NAT. RESOURCES J. 201, 207-08 (1978) (noting institutional limitations to withdrawing groundwater). Hayton suggests the Constitution merely protects surface water. "Inasmuch as the 1917 Constitution of Mexico did not identify ground waters among the waters that were declared to be the property of the nation, the owner of the overlying land still has title to 'his' ground water and the national power is limited." *Id.* at 203. The author carefully conditions this statement by noting that he does not "attempt . . . to be specific about the groundwater legal or administrative regimes in Mexico." *Id.* at 203 n.6. The significance of Professor Hayton's statement, contrary to other commentators, is that Mexico may have difficulty regulating pumping. This problem is one of jurisdiction similar to that in the United States.

tantly, the deeply ingrained view of the Mexican people towards water as belonging to all, and the subsequent transfer of control of water to the federal government, makes water questions issues of national significance, readily vociferously addressed by a passionate public.¹²⁵

3. Environmental Statutes and Water

The first major environmental statute of Mexico, the Federal Law for Prevention and Control of Environmental Pollution, was passed in 1971.¹²⁶ Pursuant to this statute, the Regulations for the Prevention and Control of Water Contamination¹²⁷ were issued, consisting of seventy articles. The Regulations gave power to the General Health Council for issuance of regulations to prevent and control water pollution. Such regulations are to be enforced through the Secretariat of Health and Assistance (SSA) in collaboration with the SARH.¹²⁸ Ten years later, the Federal Law of Environmental Protection (LFPA) was passed, the third chapter of which (Articles 21-28) was devoted to water pollution.¹²⁹ Three years later, the General Health Law was passed, and the Secretariat of Health and Assistance became the Secretariat of Health. Additionally, the SEDUE was created¹³⁰ for environmental protection. In 1988, these laws were superseded by the General Law of Ecological Equilibrium and Environmental Protec-

125. As Mumme thoughtfully states:

. . . such policy goals, involving issues of national patrimony, are ordinarily politicized and symbolic. Mexico's historical relationship with the United States, and its nationalistic and personalist form of government, practically insure that such issues will be prominently featured in Mexican politics.

Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 520 (1980).

126. Federal Law for the Prevention and Control of Environmental Pollution, D.O., Mar. 23, 1971. This statute was broad-based, including measures for air, water, and soil contamination. *Id.*

127. Regulations for the Prevention and Control of Water Contamination, D.O., Mar. 24, 1973.

128. See Charles T. Dumars & Salvador Beltran Del Rio, *A Survey of the Air and Water Quality Laws of Mexico*, 28 NAT. RESOURCES J. 787, 803 (1988) (providing more detailed explanation of Regulations). The Mexican government shortly thereafter created within SSA the Subsecretariat for Environmental Improvement (SMA) as a control agency whose goal was to coordinate actions of other agencies, plan environmental improvement projects, and enforce the law. *Id.* at 790.

129. See *id.* (describing LFPA). LFPA also recognized the force of other civil statutes, such as the Federal Water Law and the General Health Law. *Id.*

130. See *id.* (explaining organization of SEDUE).

tion (General Ecology Law),¹³¹ which provides for protection of natural resources, as well as the prevention of pollution. Regulations must be promulgated to implement the comprehensive general policy and criteria of the statute. Although Mexico failed to issue broad-based regulations for the 1972 legislation, and issued no regulations for the 1982 statute, it has issued four regulations under the 1988 legislation.¹³² The Border Plan indicates that the Mexican government expects shortly to issue "a new regulation dealing with the prevention and control of water pollution."¹³³ The regulations are implemented through the issuance of technological standards (NTEs) and ecological criteria. Ecological water standards have been and continue to be drafted.¹³⁴

The General Health Law, cited by the Plan as empowering the Secretariat of Health to issue water quality standards,¹³⁵ specifically prohibits "the discharge of residual water or contaminants into any surface or *underground* body of water which may be for human use or consumption."¹³⁶

It would thus appear that Mexico has begun to create a statutory and regulatory framework within which to protect water as a national resource for the benefit of its people. Mexico's actions are consistent

131. General Law of Ecological Equilibrium and Environmental Protection, D.O., 1988.

132. See U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994), Annex A, A-1 (1992) (noting regulations). Mexico has issued regulations concerning national air pollution, air pollution in Mexico City, hazardous wastes, and environmental impact statements. *Id.*

133. *Id.*

134. *Id.* As of November, 1990, fifty-seven technical ecological standards (NTEs) and ecological criteria have been issued to implement the regulations. Since then, the SEDUE has also approved several additional NTEs involving source categories for water. *Id.*

135. *Id.*

In accordance with the General Health Law in Mexico, the Secretariat of Health sets water quality standards for human use and consumption, as well as standards relating to treatments for water disinfection, and performs monitoring and certification of drinking water quality. A national system to monitor and certify water has been established and is applicable throughout Mexico.

U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) Annex A, A-2 (1992). The SEDUE, the National Water Commission (NWC) created under the SAH, and the Secretariat of Health are concerned with water quality standards. *Id.*

136. Charles T. Dumars & Salvador Beltran Del Rio M., *A Survey of the Air and Water Quality Laws of Mexico*, 28 NAT. RESOURCES J. 787, 801 (1988).

with the nation's long-held ideal that water is a cherished community good.

C. *The Border States and Groundwater Law*

1. California

a. Lack of Statutory Base

Experts have declared that California pumps more groundwater than any other state.¹³⁷ Yet, California has no comprehensive statutory framework for control of groundwater. Although some water districts have instituted groundwater management programs,¹³⁸ California has not enacted a state-wide permit system. As a policy matter, experts frequently quote the scholar Frank Trelease's characterization of the California solution: "if you have a water problem, pour water on it and it will go away."¹³⁹ This statement refers to the tendency of Californians to recharge aquifers with imported water or surface water following pumping, generally for irrigation. Northern Californians, preferring groundwater management to development and exportation of that region's water, have long lobbied for state-wide control.¹⁴⁰

Although comprehensive state groundwater legislation has been repeatedly proposed in California, such legislation has not gained sufficient political support for enactment.¹⁴¹ Conversely, local legislation designed to deal with overdrafting of groundwater basins has success-

137. Gary Weatherford, et al., *California Groundwater Management: The Sacred and the Profane*, 22 NAT. RESOURCES J. 1031, 1031 (1982).

138. *See id.* at 1035-36 (describing management system employed by Orange County Water District of Southern California).

139. *Id.* at 1039 (citing Frank J. Trelease, *Legal Solutions to Groundwater Problems—A General Overview*, 11 PAC. L.J. 863, 865 (1980)).

140. *See* Gary Weatherford, et al., *California Groundwater Management: The Sacred and the Profane*, 22 NAT. RESOURCES J. 1031, 1041 (1982) (explaining approaches used in Northern California). Referendums pitting Southern Californians against Northern Californians have resulted in a lack of state control. *Id.*

141. *See* Ronald B. Robie & Patricia R. Donovan, *Water Management of the Future: A Ground Water Storage Program for the California State Water Project*, 11 PAC. L.J. 41, 51 (1979) (noting that ground water legislation has been debated but that actual enacted legislation is sparse). In 1913, the California Conservation Commission, while drafting the permit and license system of surface waters, recommended a similar groundwater treatment. *Id.* Deemed too "vast" a task, the recommendation failed to pass. *Id.* Subsequent legislative efforts in 1917, 1923, 1953, and 1961 all met with defeat. Russell Kletzing, *Imported Groundwater Banking: The Kern Water Bank—A Case Study*, 19 PAC. L.J. 1225, 1254-55 (1988) (outlining attempts by California to adopt legislation).

fully limited pumping and prohibited exportation of groundwater.¹⁴² Moreover, in Orange County, the water district combined water importation with a reduction in pumping to replenish seriously depleted area water levels.¹⁴³ A pump tax was also introduced, which a number of counties adopted.¹⁴⁴ However, in those regions where a basin overlaps many counties, jurisdictional difficulties have arisen.¹⁴⁵

This concept of local control of groundwater was recognized as the favored view by the Governor's Commission on Water Rights.¹⁴⁶ The Commission Report gave local agencies primary authority to deal with groundwater problems and suggested that the state take action only if the local government failed to act.¹⁴⁷ The political resistance to generalized groundwater legislation in California has been largely regarded as an insurmountable barrier to comprehensive groundwater management.¹⁴⁸ This political obstacle suggests that localized control over groundwater in California will continue to garner the support of the public and lawmakers.

California does have broad policy provisions relating to groundwater in existing state legislation.¹⁴⁹ To date, these Water Code sections have not been the basis of any statewide action.¹⁵⁰ Moreover,

142. See Russell Kletzing, *Imported Groundwater Banking: The Kern Water Bank—A Case Study*, 19 PAC. L.J. 1225, 1261 (1988) (stating that four county ordinances and two state laws enacted to prevent exportation of groundwater).

143. See *id.* at 1259-61 (discussing program of Orange County Water District).

144. See *id.* at 1260 (discussing pump tax implemented in Bakersfield).

145. See *id.* at 1262 (noting possible conflicts).

146. See Russell Kletzing, *Imported Groundwater Banking: The Kern Water Bank—A Case Study*, 19 PAC. L.J. 1225, 1255 (citing GOVERNOR'S COMMISSION TO REVIEW CALIFORNIA WATER RIGHTS LAW, FINAL REPORT (1978)).

147. See *id.* at 1254-55 (reporting mandatory administration of plan by state or local agencies); Michael P. Mallery, Comment, *Groundwater: A Call for a Comprehensive Management Program*, 14 PAC. L.J. 1279, 1279 (1983) (noting findings in Commissioner's report).

148. See generally Barbara T. Andrews & Sally K. Fairfax, *Groundwater and Intergovernmental Relations in the Southern San Joaquin Valley of California: What Are All These Cooks Doing to the Broth?*, 55 U. COLO. L. REV. 145 (1984) (explaining attitudes toward groundwater use and growing desire for state and federal involvement); Zachary A. Smith, *Rewriting California Groundwater Law: Past Attempts and Prerequisites to Reform*, 20 CAL. W. L. REV. 223 (1984) (describing efforts to implement groundwater legislation).

149. See Cal. Water Code §§ 104-05 (West 1971) (declaring California's interest in its water use and providing for state management). These provisions recognize the authority of the states to control surface or underground water for public protection or for the greatest public benefit. *Id.*

150. See Russell Kletzing, *Imported Groundwater Banking: The Kern Water Bank—A Case Study*, 19 PAC. L.J. 1225, 1258-59 (1988) (stating that consideration being given to filing action in San Gabriel Basin).

the principal state water quality control statute, the Porter-Cologne Act, provides only limited regulatory authority to protect groundwater quality threatened by changes in quantity or flow.¹⁵¹

b. A Mixed Legal Doctrine

California has used the doctrine of prior appropriation and correlative rights to govern surface water, which is now regulated by the State Water Resources Control Board.¹⁵² Groundwater rights have been interpreted largely by the doctrine of correlative rights, although commentators have confused the issue by noting a patchwork of doctrines including appropriative rights, mutual prescription, and equitable apportionment.¹⁵³

Although California has taken the position that the superadjacent landowner has the rights to groundwater, it has limited "the landowner's use to amounts that he can beneficially use on his own land, subject to the corresponding ('correlative') rights of other landowners using the same underground aquifer."¹⁵⁴ The prior appropriation doctrine is applied, however, if the water is to be used elsewhere.¹⁵⁵ Such rights are subordinate to the overlying owner's rights. In overdraft situations, all owners and appropriators are deemed to have acquired prescriptive rights against one another, hence the doctrine of mutual prescription.¹⁵⁶

Formulas based on quantities pumped over the past five years were generally agreed upon in adjudications as elements of prescriptive rights. The basins were subject to "safe yield determinations for the basin."¹⁵⁷ Recent cases have eliminated this automatic approach where public users are involved, applying instead equitable apportion-

151. See Andrew H. Sawyer, *State Regulation of Groundwater Pollution Caused By Changes in Groundwater Quality or Flow*, 19 PAC. L.J. 1267, 1271-82 (1988) (reviewing limitations of statute).

152. See generally Gary Weatherford, et al., *California Groundwater Management: The Sacred and the Profane*, 22 NAT. RESOURCES J. 1031 (1982) (discussing role of California regulators).

153. See *id.* at 1033 (discussing complexity of California groundwater law).

154. Robert D. Hayton, *The Ground Water Legal Regime as Instrument of Policy Objectives and Management Requirements*, 22 NAT. RESOURCES J. 119, 125 (1982).

155. *Id.*

156. See Russell Kletzing, *Imported Groundwater Banking: The Kern Water Bank—A Case Study*, 19 PAC. L.J. 1225, 1227 (1988) (discussing doctrine of mutual prescription).

157. *Id.*

ment.¹⁵⁸ The "safe yield" concept continues to be upheld.¹⁵⁹

c. Mexico-California Groundwater Basins

The Colorado Rivers and the Tijuana River provide groundwater basins shared by California and Mexico. Pumping is occurring on both sides of the border, causing increased salt intrusion, overdrafting, land subsidence, and poor water quality. To date, no agreements on pumping exist between the United States and Mexico relating to the California-Mexico pumping problem.

2. Arizona

a. Statutory Base

Groundwater has been called the "lifeblood" of Arizona agriculture.¹⁶⁰ Accordingly, threatened by dangerous overdrafting of underground reserves and the loss of federal funding for a massive water project,¹⁶¹ the Groundwater Study Commission, comprised of legislators and representatives of water interests, proposed a bill adopted by the legislature in 1980.¹⁶² The bill, the Arizona Groundwater Management Act (GMA), creates Active Management Areas (AMAs) in

158. See *City of Los Angeles v. City of San Fernando*, 537 P.2d 1250, 1298 (1975) (describing factors considered in equitable apportionment).

159. See *City of Pasadena v. City of Alhambra*, 207 P.2d 17, 28 (1949) (discussing concept of safe yield). Safe yield has largely been ignored in unadjudicated situations. Russell Kletzing, *Imported Groundwater Banking: The Kern Water Bank—A Case Study*, 19 PAC. L.J. 1225, 1228 (1988).

160. Jeffrey Gross, Comment, *Transboundary Water Quantity: The Effect of Arizona and Mexican Groundwater Law on Arizona's Agriculture*, 5 ARIZ. J. INT'L & COMP. L. 189, 189 (1988). Arizona uses 78% of its water resources for agriculture. *Id.*; see Robert Emmet Clark, *Overview of Groundwater Law at Institutions in U.S. Border States*, 22 NAT. RESOURCES J. 1007, 1012-14 (1982) (assessing groundwater law on United States-Mexico border). See generally Robert Emmet Clark, *Institutional Alternatives for Managing Groundwater Resources: Notes for a Proposal*, 18 NAT. RESOURCES J. 153 (1978) (providing alternative proposal for managing groundwater on the United States-Mexico border).

161. One commentator has suggested that Arizona's passage of groundwater legislation eliminating groundwater mining was politically required by the Carter Administration in exchange for funding for the construction of the Central Arizona Project. Desmond D. Connall, Jr., *A History of the Arizona Groundwater Management Act*, 1982 ARIZ. ST. L.J. 313, 329.

162. ARIZ. REV. STAT. ANN. § 45-411 (1987). See Robert Jerome Glennon, "Because That's Where the Water Is": Retiring Current Water Users to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act, 33 ARIZ. L. REV. 89, 90-91 (1991) (discussing development of legislation and GMA). See generally Desmond D. Connall, Jr., *A History of the Arizona Groundwater Management Act*, 1982 ARIZ. ST. L.J. 313 (presenting history of GMA); Jon L. Kyl, *The 1980 Arizona Groundwater Management Act: From Inception to Current Constitutional Challenge*, 53 U. COLO. L. REV. 471 (1982) (reviewing GMA); Philip R.

the four critically depleted regions of Tucson, Phoenix, Prescott, and Pinal.¹⁶³ In AMAs, farmers must have irrigated land within the past five years by pumping to continue this practice.¹⁶⁴ No new acreage may be irrigated. Groundwater rights are also subject to a credit and trading program by farmers.¹⁶⁵ Pumped water is measured to control "actual beneficial use."¹⁶⁶ The GMA's objective is to conserve water.

The GMA operates like a ratchet and moves only in one direction: controlling water use. The Act provides for DWR [Department of Water Resources] to develop a series of Management Plans that, over time, ideally will reduce the quantity of water used. Within AMAs, the Act prohibits irrigating new lands, encourages a shift from irrigation to less consumptive non-irrigation uses, and prohibits a shift from non-irrigation use to irrigation.¹⁶⁷

Within the AMAs, the GMA protects existing irrigation uses.¹⁶⁸ The AMAs are subject to permit requirements, and consumption is monitored. However, in other areas of the state, the common-law doctrine of reasonable use continues to be applied to groundwater pumping.¹⁶⁹

The GMA has been severely criticized for protecting existing users while advocating a safe-yield policy.¹⁷⁰ The conflict between the agriculture sector and urban developers has forced the state to begin to examine the true impact of farming on the state's economy in relation

Higdon & Terence W. Thompson, *The 1980 Arizona Groundwater Management Code*, 1980 ARIZ. ST. L.J. 621 (setting forth background of GMA).

163. ARIZ. REV. STAT. ANN. § 45-411 (1987). Sixty-nine percent of the state's total overdraft and over 80% of the state's population are within the AMAs. Robert Jerome Glennon, "Because That's Where the Water Is": Retiring Current Water Users to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act, 33 ARIZ. L. REV. 89, 90 n.2 (1991).

164. ARIZ. REV. STAT. ANN. § 45-465(A) (Supp. 1992).

165. ARIZ. REV. STAT. ANN. § 45-467 (Supp. 1990); see Robert Jerome Glennon, "Because That's Where the Water Is": Retiring Current Water Users to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act, 33 ARIZ. L. REV. 89, 97 (1991) (criticizing these two programs as frustrating purpose of Act).

166. Robert E. Clark, *Overview of Groundwater Law and Institutions in United States Border States*, 22 NAT. RESOURCES J. 1007, 1013 (1982).

167. Robert Jerome Glennon, "Because That's Where the Water Is": Retiring Current Water Users to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act, 33 ARIZ. L. REV. 89, 91 (1991).

168. See *id.* at 104 (explaining that existing irrigation uses have grandfathered protection).

169. *Id.*

170. See *id.* at 105 (noting that GMA's effect inherently inconsistent with objective).

to the amount of water farmers consume for irrigation.¹⁷¹ Because the farmers produce hay and cotton, as opposed to foodstuffs, water scholars suggest that the farmers should give up some water for other public uses.¹⁷² Water allocation in Arizona will continue to present intra-state conflicts among competing economic interests, as well as conflicts between commercial and municipal users.¹⁷³

b. Doctrine of Reasonable Use

Arizona has long recognized the common law doctrine of reasonable use, permitting a landowner to enjoy the right to water below his land and pump such water as he or she could reasonably and beneficially use.¹⁷⁴ While pumpers within AMAs are subject to beneficial-use standards, the more vague standard of reasonable use, which can inherently lead to the abuse of other's rights, continues to be applied elsewhere in the state. As Professor Clark remarked on the need for a groundwater statute:

It became necessary as a result of a series of court decisions that exposed what the "reasonable use" rule had encouraged for years, viz., *unreasonable* uses including withdrawals far beneath Indian and federal and state public lands producing an enormous overdraft.¹⁷⁵

Despite passage of the GMA, the Arizona Supreme Court has described Arizona water law as "a bifurcated system in which percolating groundwater is regulated under a set of laws completely distinct

171. See Robert Jerome Glennon, "Because That's Where the Water Is": Retiring Current Water Users to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act, 33 ARIZ. L. REV. 89, 101-05 (1991) (setting forth role of agriculture in Arizona economy and conflicts with developers); *id.* at 102-03 n.75-78 (presenting statistical data).

172. See *id.* at 101-105 (analyzing water allocation); see also Gary C. Woodward & Elizabeth Checchio, *The Legal Framework for Water Transfers in Arizona*, 31 ARIZ. L. REV. 721, 728-38 (1989) (setting forth water transfer strategies); Ellen K. Wheeler, Note, *The Right to Use Groundwater in Arizona After Chino Valley II and Cherry v. Steiner*, 25 ARIZ. L. REV. 473, 475-84 (1983) (presenting approaches to water distribution as affected by common law).

173. See generally William Parsons & Douglas Mathews, *The Californiaization of Arizona Water Politics*, 30 NAT. RESOURCES J. 341 (1990) (reviewing water practices vis-à-vis political processes in California and Arizona).

174. See *Bristor v. Cheatham*, 255 P.2d 173, 178 (Ariz. 1953) (explaining doctrine of reasonable use).

175. Robert Emmet Clark, *Overview of Groundwater Law and Institutions in United States Border States*, 22 NAT. RESOURCES J. 1007, 1013 (1982). Clark observes that such exploitation resulted in judicial action which further encouraged the legislature to enact the GMA. *Id.*

from the laws regulating surface water.”¹⁷⁶ The impact of groundwater upon surface water continues to cause the courts to shy away from decisions which would disrupt the established legal frameworks of water law. Despite scientific evidence to the contrary, and the built-in safe-yield concept of the GMA, the Arizona courts appear to refrain from tampering with the common law doctrines.¹⁷⁷

c. Arizona-Mexican Groundwater Basins

Groundwater in the Arizona-Sonora boundary area near San Luis has been the source of conflict for some time.¹⁷⁸ In a dispute over Mexican pumping, an act which Americans claim to be an illegal taking of the Colorado River in violation of the Water Treaty of 1944, the two countries have agreed to eliminate pumping within 5 miles of the Arizona-Sonora boundary near San Luis and to limit pumping to 160,000 area feet annually.¹⁷⁹

3. New Mexico

a. Statutory Base

New Mexico groundwater, regulated by state law since 1931, is the property of the public, subject to the doctrine of prior appropriation.¹⁸⁰ Amendments to New Mexico laws have created a permit system, supervised by the State Engineer, which is administered under the doctrine of appropriated rights.¹⁸¹ The State has, however, preserved by statute the use of wells for “nominal personal domestic use.”¹⁸² Groundwater rights can be sold or transferred, regardless of location or purpose, subject to approval by the State Engineer.¹⁸³

176. *Collier v. Arizona Dep't of Water Resources*, 722 P.2d 363, 366 (Ariz. 1986).

177. See John D. Leshy & James Belanger, *Arizona Law Where Ground and Surface Water Meet*, 20 ARIZ. ST. L.J. 657, 740-44 (1988) (urging Arizona courts to acknowledge hydrologic reality in pending general stream adjudications).

178. See Michael D. Bradley & Kenneth J. DeCook, *Ground Water Occurrence and Utilization in the Arizona-Sonora Border Region*, 18 NAT. RESOURCES J. 29, 30-32 (1978) (describing development of groundwater resources along Arizona-Sonora border).

179. Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, IBWC Minute No. 242, Aug. 30, 1973, Mex.-U.S., 24 U.S.T. 1971.

180. See Charles T. DuMars, *New Mexico Water Law: An Overview and Discussion of Current Issues*, 22 NAT. RESOURCES J. 1045, 1048 (1982) (citing N.M. STAT. ANN. § 72-5-27 (1978)).

181. See *id.* at 1048-52 (providing fulsome explanation of New Mexico program).

182. N.M. STAT. ANN. §§ 72-12-18 (1985).

183. See Charles T. DuMars, *New Mexico Water Law: An Overview and Discussion of*

State maps show over 75,546 square miles of underground water basins in New Mexico, approximately 2/3 of the state.¹⁸⁴ Moreover, state courts have recognized the hydrological relationship between surface and groundwater.¹⁸⁵

b. Legal Doctrine of Prior Appropriation

New Mexico was one of the territories ceded to the United States in 1848,¹⁸⁶ and as such, it continued in the tradition of Mexican civil law by recognizing that water belongs to no one. The general principle of the prior appropriation doctrine, recognized by Mexican law, was persistently applied in New Mexico through territorial days and, in fact, predates the New Mexico Constitution.¹⁸⁷ By statute, New Mexico adopted the principle that all water in New Mexico "running in natural streams and underground belongs in effect to the state as trustee for the people."¹⁸⁸

In New Mexico, one may acquire property rights in water. Consistent with early Spanish law, those rights may be limited by the state to the "beneficial use" of such water. Beneficial use is defined as water *used*, not water appropriated. Thus, if one ceases to use one's water, others may claim the right to appropriate it. Today, priority dates are assigned and those with the oldest dates may take the water, even when water is scarce.¹⁸⁹ Water then becomes an economic

Current Issues, 22 NAT. RESOURCES J. 1045, 1052 (1982) (citing N.M. STAT. ANN. § 72-12-7 (1978)); *id.* at 1047-57 (discussing role of state engineer). The State Engineer's managerial functions in New Mexico encompass two basic areas. *Id.* The first is calculating a reasonable rate of groundwater mining for mined aquifers and second, in rechargeable aquifers, coordinating the relationships between the groundwater withdrawals and prior surface commitments in the form of prior appropriative rights, interstate compacts, and treaties. *Id.*

184. *Id.* at 1049.

185. See generally *Mathers v. Texaco*, 421 P.2d 771 (N.M. 1966) (considering hydrology); *City of Albuquerque, v. Reynolds*, 379 P.2d 73 (N.M. 1962) (noting hydrology principles).

186. Treaty of Guadalupe Hidalgo, Treaty of Peace, Friendship, Limits and Settlement with the Republic of Mexico, Feb. 2, 1848, U.S.-Mex., art. 5, 9 Stat. 922, 926-28.

187. Charles T. DuMars, *New Mexico Water Law: An Overview and Discussion of Current Issues*, 22 NAT. RESOURCES J. 1045, 1046 n.12 (1982).

188. *Id.* at 1046-47.

189. See *id.* at 1045 (explaining effect of priority dates). Professor DuMars notes: Although stated differently in the various western states, the prior appropriation system has always contained two essential principles:

- (1) The first user (appropriator) in time has the right to take and use water; and
- (2) that right continues as against subsequent users as long as the appropriator puts the water to beneficial use.

commodity.

Groundwater in New Mexico, unlike in other states,¹⁹⁰ is clearly subject to the prior appropriation doctrine. More importantly, New Mexico is unique in recognizing the hydrological relationship between surface waters and groundwaters. While interpreting the correct duties of the State Engineer in regulating groundwater, the Supreme Court of New Mexico recognized the need to measure the amount of pumped water and the amount of return flow to determine the impact on those individuals holding rights to the surface water. The court upheld the need to retire such surface water rights¹⁹¹ before permitting pumping. Thus, New Mexico has a regulated and integrated groundwater program.

Although New Mexico has a history of managing aquifers, it still faces future difficult allocation choices between competing prior appropriators and potential water users.¹⁹² This difficulty is further compounded by the lack of groundwater management by New Mexico's neighbor state, Texas.

c. New Mexico Shared Basins

New Mexico shares transboundary groundwater basins with Mexico and Texas.¹⁹³ Control of these basins is further complicated by uncontrolled pumping in Texas which has led to legal battles over the right of Texas municipalities to pump New Mexico's groundwater in

Id. Mr. Dumars further states:

Most prior appropriation jurisdictions recognize beneficial use as the basis, the measure, and the limit of the right to use water. The common theme in all these states is that the beneficial use means application of water to a lawful purpose which is useful to the appropriator and at the same time is a use consistent with the general public interest in having water utilized to its maximum.

Id.

190. See generally Robert Emmet Clark, *Ground Water Law: Problem Areas*, 8 NAT. RESOURCES LAW 377 (1975) (comparing water law in different regions).

191. See *Mathers v. Texaco*, 421 P.2d 771, 777 (N.M. 1966) (holding mined aquifer subject to beneficial use despite lowering of water table); *City of Albuquerque v. Reynolds*, 379 P.2d 73, 81 (N.M. 1962) (upholding state engineer's finding that surface rights be retired as necessary to protect prior stream appropriators).

192. See Charles T. DuMars, *New Mexico Water Law: An Overview and Discussion of Current Issues*, 22 NAT. RESOURCES J. 1045, 1062 (1982) (summarizing problems of water competitors). For example, Indian entitlement is a major entitlement problem in New Mexico complicating the developer/farmer/municipal user issues. *Id.* at 1058-60.

193. J.C. Day, *International Aquifer Management: The Hueco Bolson on the Rio Grande River*, 18 NAT. RESOURCES J. 163, 163 (1978) (noting geography of New Mexico's groundwater basin).

the face of New Mexico's permit system.¹⁹⁴ New Mexico's conservative approach to groundwater under the state statutes has led its unregulated neighbors to assert that New Mexico is exploiting the water supply.¹⁹⁵

4. Texas

a. Questionable Lack of Statutory Base

Texas has legislation in place to control surface water, but the state has been reluctant to control groundwater.¹⁹⁶ Indeed, at least one commentator, who has compared Texas groundwater law to other western states, has determined that Texas groundwater law is "characterized by large voids."¹⁹⁷ Although Texas has enacted statutes which broadly mandate the Texas Water Commission to create and enforce regulations "conserving, protecting, preserving and distributing underground subterranean, and percolating water located in this state,"¹⁹⁸ no such rules have ever been issued. The lack of rules is likely the result of a 1941 Attorney General Opinion declaring a statute predating the Texas Water Code, but which contained very similar language, an unconstitutional delegation of legislative authority.¹⁹⁹ In a new position letter, the current Texas Attorney General recently overturned the 1941 opinion citing subsequent Texas case law recognizing a broader base of legislative authority.²⁰⁰ Pursuant to that opinion, the Texas Water Commission issued a management plan to

194. See *City of El Paso v. Reynolds*, 563 F. Supp. 379, 380-81 (D. N.M. 1983) (presenting factual dispute over water use at New Mexico-Texas border), *vacated and rev'd*, 597 F. Supp. 694, 708 (D. N.M. 1984). See generally Nancy E. Herrick, Note, *Recent Developments in the El Paso/New Mexico Interstate Groundwater Controversy—The Constitutionality of New Mexico's New Municipality Water Planning Statute*, 29 NAT. RESOURCES J. 223 (1989) (reviewing state border water conflicts).

195. Charles T. DuMars, *New Mexico Water Law: An Overview and Discussion of Current Issues*, 22 NAT. RESOURCES J. 1045, 1054-58 (1982) (exploring arguments presented by states bordering New Mexico).

196. Corwin W. Johnson, *The Continuing Voids in Texas Groundwater Law: Are Concepts and Terminology to Blame?*, 17 ST. MARY'S L.J. 1281, 1281-82 (1986).

197. *Id.* at 1282.

198. TEX. WATER CODE ANN. § 28.011 (Vernon 1988).

199. See Op. Tex. Att'y Gen. No. DM-54 (1991) (reversing 1941 opinion).

200. See *id.* (relying upon notion of generalized mandate coupled with public welfare concerns to effectuate legislative purposes). The Attorney General opinion cites *Med-Safe, Inc. v. Texas*, 752 S.W.2d 640 (Tex. 1988); *Jordon v. State Bd. of Ins.*, 334 S.W.2d 278 (Tex. 1960); and *Lone Star Gas Co. v. Railroad Comm'n of Texas*, 798 S.W.2d 888 (Tex. App.—Austin 1990, writ granted). *Id.*

the embattled Edwards aquifer.²⁰¹ After first holding that the aquifer was not an underground river subject to state control, a state district court promptly declared the plan to be without legal authority.²⁰²

Commentators have frequently pointed out the shortcomings of Texas groundwater law which include the general absence of provisions for resolving conflicts among pumpers, the lack of integration of groundwater and surface water rights, and the non-existence of programs designed to protect aquifers from damaging depletion.²⁰³ Moreover, there is no relevant constitutional provision on groundwater management.²⁰⁴ Commentators have repeatedly suggested that political leaders have not faced comprehensive groundwater issues because these leaders fear the ire of landowners who will undoubtedly claim federal and state constitutional violations.²⁰⁵

The legislature has authorized the creation of voluntary under-

201. The uncontrolled pumping by a catfish farm owner in Bexar County of forty-five million gallons of groundwater a day from the Edwards Aquifer has initiated heated litigation. Dwight Silverman, *Water Gusher Spilled Over into Aquifer Fight*, HOUS. CHRON., Nov. 15, 1992, at A1.

202. See Diana R. Fuentes, *Edwards Aquifer is Not a River, State Judge Rules*, SAN ANTONIO EXPRESS NEWS, Sept. 12, 1992, at A1 (discussing court's ruling). The Texas Water Commission had declared on April 15, 1992 that the Edwards Aquifer was an underground river and subject to laws governing surface water rights and use. *TWC Designates Aquifer as an Underground River*, HOUS. POST, Apr. 16, 1992, at A26; see Todd Ackerman, *Federal Official Backs Plan for Edwards Aquifer*, HOUS. CHRON., Aug. 21, 1992, at A23 (discussing TWC's classification of aquifer); Dwight Silverman, *Water Gusher Spilled Over Into Aquifer Fight*, HOUS. CHRON., Nov. 15, 1992, at A1 (setting forth facts leading to debate over water rights in San Antonio); Dwight Silverman, *Bubbling Debate: Water Rights to Edwards Aquifer*, HOUS. CHRON., Nov. 15, 1992, at D12 (explaining basis of Edwards aquifer dispute).

203. See, e.g., James N. Castleberry, Jr., *A Proposal for Adoption of a Legal Doctrine of Ground-Stream Water Interrelationship in Texas*, 7 ST. MARY'S L.J. 503, 508 (1975) (noting that statutory provisions leave much unanswered); Corwin W. Johnson, *Texas Groundwater Law: A Survey and Some Proposals*, 22 NAT. RESOURCES J. 1017, 1024-28 (1982) (pointing out inadequacies of groundwater law in Texas); Karen H. Norris, Comment, *Stagnation of Texas Ground Water Law: Political v. Environmental Stalemate*, 22 ST. MARY'S L.J. 493, 498-503 (1991) (arguing that development of groundwater law inadequate in Texas); Stephen E. Snyder, Comment, *Ground Water Management: A Proposal for Texas*, 61 TEXAS L. REV. 289, 289 (1973) (remarking that Texas courts have deemed themselves powerless to control groundwater use).

204. An argument may be made, however, that Article XVI, Section 59 of the Texas Constitution, which mandates conservation of the natural resources of the state, provides broad basis for water policy and regulation statutes. Indeed, it is cited, along with Article III, Section 52 of the Texas Constitution, as the basis for TEX. WATER CODE ANN. §§ 52.001, 52.548 (Vernon 1972 & Supp. 1993) which created underground water conservation districts.

205. E.g., Corwin W. Johnson, *The Continuing Voids in Texas Groundwater Law: Are Concept and Terminology to Blame?*, 17 ST. MARY'S L.J. 1281, 1288 (1986) (noting reasons behind lack of legislative action).

ground water conservation districts which are empowered to regulate groundwater withdrawal.²⁰⁶ The Supreme Court of Texas recognized that this legislative action was "proper" and noted the "inevitable" conflicts which will arise and the resulting "need for additional legislation . . . to cover unregulated groundwater reservoirs."²⁰⁷

Legislators appear to be drafting groundwater management plans in response to the state court's dismissal of the Water Commission's plan. Such action may prompt a concerted legislative effort to regulate groundwater in Texas.

b. Legal Doctrine of Absolute Ownership

Although Texas courts are bound by treaty to apply the law in existence at the time of grants, which would force application of Spanish law in certain situations,²⁰⁸ they adopted in 1904 the English doctrine of absolute ownership.²⁰⁹ This doctrine gives the landowner the right to "percolating waters" below his or her land, to which he or she enjoys unlimited rights regardless of the impact upon adjoining landowners.²¹⁰ This concept of water rights based solely on property

206. TEX. WATER CODE ANN. § 52.169 (Vernon Supp. 1993).

207. *Friendswood Dev. Co. v. Smith-Southwest Indus.*, 576 S.W.2d 21, 30 (Tex. 1978). See *Beckendorff v. Harris-Galveston Coastal Subsidence Dist.*, 558 S.W.2d 75, 78-82 (Tex. Civ. App.—Houston [14th Dist.] 1977, writ ref'd n.r.e.) (discussing constitutionality of special water districts).

208. See *State v. Valmont Plantations*, 346 S.W.2d 853, 855-78 (Tex. Civ. App.—San Antonio 1961) (reviewing law of Spain and Mexico and its applicability in Texas) *aff'd*, 355 S.W.2d 502 (1962).

209. See *Houston & T.C. Ry. Co. v. East*, 98 Tex. 146, 81 S.W. 279, 281-82 (Tex. 1904) (holding unlimited pumping by landowner permitted despite impact on adjoining landowner). But see Joe R. Greenhill & Thomas Gibbs Gee, *Ownership of Groundwater in Texas; The East Case Reconsidered*, 33 TEX. L. REV. 620, 629 (1955) (presenting critical commentary of *East* decision). See generally Harbert Davenport & J.T. Canales, *The Texas Law of Flowing Waters with Special Reference to Irrigation from the Lower Rio Grande*, 8 BAYLOR L. REV. 138 (1956) (providing complete history of Texas water law).

210. Harbert Davenport & J.T. Canales, *The Texas Law of Flowing Waters with Special Reference to Irrigation from the Lower Rio Grande*, 8 BAYLOR L. REV. 138, 147 (1956). The Texas Supreme Court relied upon the reasoning of an Ohio opinion, *Frazier v. Brown*, which noted the "secret, occult, and concealed" movements of groundwater which make regulation difficult. *East*, 81 S.W. at 280-81. Texas courts have clung to the doctrine of absolute ownership despite its faulty theoretical basis. See James N. Castleberry, Jr., *A Proposal for Adoption of a Legal Doctrine of Ground-Stream Water Interrelationship In Texas*, 7 ST. MARY'S L.J. 503, 508-10 (1975) (discussing Texas water law doctrines). As observed by Judge Wilson:

I am convinced that the rationale of *Frazier v. Brown* has been rebutted and answered by the course of our history and the entire trend of our jurisprudence since that decision and since the *East* case. Although this court can close its eyes to the advancement of scientific

rights has been consistently upheld by Texas courts. In a recent case, *Friendswood Development Co. v. Smith-Southwest Industries, Inc.*,²¹¹ the court recognized established Texas property law and refused to limit withdrawal of groundwater, absent willful waste or malice, despite subsidence of land claims by adjacent landowners.²¹² The court, however, did impose a new limitation upon this absolute right of ownership by establishing prospective liability for negligent pumping that proximately causes subsidence.²¹³ Often criticized, this doctrine of groundwater as a property right has appeared almost intractable as an element of the common law regime. Indeed, the *Friendswood* court, while recognizing that "some aspects of the English or common law rule as to underground water are harsh and outmoded,"²¹⁴ felt compelled "to recognize that it has become an established rule of property law in the state."²¹⁵ Texas courts apparently believe water policy and regulation to be properly within the purview of the legislature.²¹⁶ Absent clear legislative action curtailing ownership of groundwater, the courts will continue to sidestep fundamental redesign of groundwater ownership.

As to judicial recognition of hydrological principles of surface and groundwater integration, Texas courts have merely noted that if a party could prove that the underground waters were, in fact, part of a water course rather than percolating, the courts would apply concepts of surface water law.²¹⁷ Yet, a Texas court has never found underground water to be anything other than "percolating."²¹⁸ Thus,

and legal knowledge and governmental techniques by reaffirming this rationale as the majority do here, I do not believe this court will always do so. . . .
City of Corpus Christi v. City of Pleasanton, 276 S.W.2d 798, 805 (Tex. 1955) (Wilson, J., dissenting).

211. 576 S.W.2d 21 (Tex. 1978).

212. *Id.* at 22.

213. *Id.* at 30.

214. *Id.* at 28.

215. *Friendswood*, 576 S.W.2d at 28.

216. *City of Corpus Christi*, 276 S.W.2d at 403.

217. *See Denis v. Kickapoo Land Co.*, 771 S.W.2d 235, Tex. App.—Austin 1989, writ denied (holding that water flowing into creek governed as surface water); *Pecos County Water Control and Improvement Dist. v. Williams*, 271 S.W.2d 503, 505 (Tex. Civ. App.—El Paso 1954, writ ref'd n.r.e.) (interpreting Texas water law with regard to percolating waters); *Cantwell v. Zinser*, 208 S.W.2d 577, 579 (Tex. Civ. App.—Austin 1948, no writ) (explaining how court must rule if water is declared percolating).

218. Absent evidence to the contrary, a court must presume that underground water is percolating rather than being a subterranean stream or the underflow of a river. *Texas Co. v. Burkett*, 296 S.W. 273, 278 (Tex. 1927); *Bartley v. Sone*, 527 S.W.2d 754, 760 (Tex. Civ.

Texas landowners continue to freely pump groundwater. However, Texas lawmakers have recognized the growing scarcity of groundwater, and such recognition, impounded by the Edwards aquifer controversy, may spark new legislative efforts at comprehensive groundwater control.²¹⁹

c. Shared Aquifers

New Mexico, Texas, and Mexico share aquifers at the border. Recharge areas along the Rio Grande are being substantially endangered by overdraft and pollution through irrigation return flow, hazardous waste, and pesticide use.²²⁰

IV. LEGAL FRAMEWORK OF EXISTING MEXICAN-UNITED STATES AGREEMENTS

A. *Water Treaty of 1944*

1. History of Mexican-United States Water Relations

In 1880, the United States and Mexico began formal correspondence relating to the use of the Rio Grande waters.²²¹ The United States initiated the correspondence on behalf of aggrieved Texas farmers who claimed that they had been deprived of irrigation by the Mexicans' digging ditches along the Rio Grande waters on the Mexican border.²²² The Mexican response, four years later, was that Mexicans had suffered more deeply than Americans because 1880 had been a very dry season.²²³ Additionally, the Mexicans claimed that they had prior appropriation claims to the Rio Grande water since the three hundred-year-old dam at Ciudad Juarez had existed prior to Texas

App.—San Antonio, 1974 writ ref'd n.r.e.); Pecos County Water Control & Improvement Dist. v. Williams, 271 S.W.2d 503, 506 (Tex. Civ. App.—El Paso 1954, writ ref'd n.r.e.).

219. See Karen N. Norris, Comment, *The Stagnation of Texas Groundwater Law: Political v. Environmental Stalemate*, 22 ST. MARY'S L.J. 493, 504-05 (reviewing legislative reports and concerns over aquifer).

220. See Randall J. Charbeneau, *Groundwater Resources of the Texas Rio Grande Basin*, 22 NAT. RESOURCES J. 957, 969-70 (1982) (discussing groundwater aquifers of Rio Grande); William J. Lloyd, *Growth of the Municipal Water System in Ciudad Juarez, Mexico*, 22 NAT. RESOURCES J. 943, 944-45 (1982) (illustrating problems of Ciudad Juarez, Mexico).

221. See James Simsarian, *The Diversion of Waters Affecting the United States and Mexico*, 17 TEX. L. REV. 27, 27 (1938) (noting correspondence). See generally *id.* at 27-61 (reviewing history of United States-Mexican action pertaining to water problems from 1880-1938).

222. *Id.* at 27-28.

223. *Id.* at 28 (citing Matías Romero, Mexican Minister to Frederick T. Frelinghusen, Secretary of State, Aug. 27, 1984, 1 MOORE, DIGEST INTERNATIONAL LAW 653 (1906)).

settlements.²²⁴ Moreover, the Mexicans noted that waste of Rio Grande waters by Colorado and Mexico farmers had aggravated the transboundary scarcity of water.²²⁵

Shortly after this correspondence, American companies formed to capture abundant waters of the Rio Grande in Colorado and New Mexico during the rainy season, intending to sell such waters to Ciudad Juarez during the dry season.²²⁶ The Mexican government protested this imbalanced taking as a serious detriment to the prior-established community of Ciudad Juarez and recommended equitable division of the border waters.²²⁷

Initially, the not-surprising American reply was that a recent, serious drought near the headwaters of the Rio Grande caused the situation at Ciudad Juarez.²²⁸ Pressed further by the Mexican government,²²⁹ Attorney General Judson Harmon issued his interpretation of existing treaty obligations and concluded that the United States, as an absolute sovereign nation, under accepted principles of international law, had no duty to halt water diversions in Colorado and New Mexico.²³⁰

Immediately after Harmon issued his opinion, negotiations commenced resulting in joint instructions to the International Boundary

224. *Id.*

225. See James Simsarian, *The Diversion of Waters Affecting the United States and Mexico*, 17 TEX. L. REV. 27, 28 (1938) (discussing problems of water scarcity).

226. *Id.* at 29-30.

227. *Id.* at 30 n.10. As early as 1890, the Rio Grande was left a dry bed for 580 miles due to takings in Colorado. *Id.*

228. *Id.* at 30.

229. Some commentators view the Mexican claim as essentially one for damages. See Stephen C. McCaffrey, *Trans-Boundary Pollution Injuries: Jurisdictional Considerations in Private Litigation Between Canada and the United States*, 3 CAL. W. INT'L L.J. 191, 205-17 (1973) (discussing history of Mexican claims for relief from American diverters). A recent United States case, however, suggests damages are due to Mexican property from harm caused by operation of dams in the United States. See *Gasser v. United States*, 14 Cl. Ct. 476, 506 (1988) (discussing flooding of Mexican property), *vacated and withdrawn*, 22 Cl. Ct. 165 (1990). See generally Anne M. Morgan, Note, *Transboundary Liability Goes With the Flow? Gasser v. United States: The Use and Misuse of a Treaty*, 30 NAT. RESOURCES J. 955 (1990) (examining *Gasser* decision). Such an interpretation would obviously contradict the policy of non-liability which the United States has engaged in for a hundred years. Moreover, while the United States publicly took this position it agreed to equitable allocation of waters at the treaty table. To suggest United States damage liability at this juncture may seriously impede process of negotiating a groundwater treaty similar to the Bellagio Draft which will be essential to Plan implementation of groundwater solutions.

230. 21 Op. Att'y Gen. 274 (1895). Once this opinion relating to possible damage claims was issued, prompt negotiations began adopting equitable principles.

and Water Commission²³¹ (IBWC) to investigate and report on the Rio Grande problem. To secure each country's legal and equitable rights, the IBWC recommended that a dam be constructed across the Rio Grande at El Paso.²³² Further, Mexico agreed to relinquish claims of lost public wealth totalling thirty-five million dollars.²³³ These provisions were adopted in the Treaty of 1906.²³⁴ Under the 1906 Treaty, the United States annually delivers 60,000 acre feet of water to Mexico. In times of shortage, deliveries are in proportion to the amounts of water available.²³⁵

2. Terms of the 1944 Treaty

After signing the 1906 Treaty, and except for a brief period from 1913 to 1919, Mexico and the United States continued discussions on border water issues.²³⁶ After years of negotiation, the two countries

231. The Convention of 1889 established the IBWC. Act of Mar. 1, 1889, 26 Stat. 1512. Initially created for a period of five years, the Convention was extended indefinitely from Dec. 24, 1900. Act of Dec. 24, 1900, 31 Stat. 1936. In the original proclamation, Art. I states:

All differences or questions that may arise on that portion of the frontier between the United States of America and the United States of Mexico where the Rio Grande and the Colorado Rivers form the boundary line, whether such differences or questions grow out of altercations or changes in the bed of the aforesaid Rio Grande and that of the aforesaid Colorado River, or of works that may be constructed in said rivers, or of any other cause affecting the boundary line, shall be submitted for examination and decision to an International Boundary Commission, which shall have exclusive jurisdiction in the case of said differences or questions.

Act of Mar. 1, 1889, 26 Stat. 1512.

232. See James Simsarian, *The Diversion of Waters Affecting the United States and Mexico*, 17 TEX. L. REV. 27, 37 (1938) (noting Commission's recommendations).

233. See *id.* at 38-39 (discussing sum of Mexico's claim and recommendations to solve dispute).

234. Treaty Relating to the Rio Grande and Distribution of the Waters Thereof, May 21, 1906, U.S.-Mex., T.I.A.S. No. 455. See James Simsarian, *The Diversion of Waters Affecting the United States and Mexico*, 17 TEX. L. REV. 27, 48-60 (1938) (outlining history of United States-Mexican border disputes and government responses thereto from 1906-38). Commentators have remarked that Americans used the revolutionary war period in Mexico to develop the Colorado Basin. See Charles A. Johnston, Jr., Comment, *Effluent Neighbors: The Mexico-U.S. Water Quality Dilemma*, 3 CAL. W. INT'L L.J. 151, 161 (1972) (mentioning development of basin); Mark A. Sinclair, Note, *The Environmental Cooperation Agreement Between Mexico and the United States: A Response to the Pollution Problems of the Borderlands*, 19 CORNELL INT'L L.J. 87, 110 n.120 (1986) (noting basin conditions in early 1900s).

235. See Neal E. Armstrong, *Anticipating Transboundary Water Needs and Issues in the Mexico-United States Border Region in the Rio Grande Basin*, 22 NAT. RESOURCES J. 877, 903 (1982) (explaining terms of 1906 Treaty).

236. See James Simsarian, *The Diversion of Waters Affecting the United States and Mexico*, 17 TEX. L. REV. 27, 48-60 (1938) (tracing negotiations between United States and Mexico). The United States broke diplomatic relations with warring Mexico. *Id.*

signed the 1944 Water Utilization Treaty (1944 Water Treaty).²³⁷

The 1944 Water Treaty designated the IBWC as the administering agency. The Treaty's stated purpose was to designate the rights of Mexico and the United States to the waters of the Colorado and Tijuana Rivers, and the Rio Grande from Fort Quitman, Texas, to the Gulf of Mexico.²³⁸ The Rio Grande waters were allocated equally between the two countries while the Colorado waters were formalized.²³⁹ The Treaty also established a priority of joint uses for international waters: "(1) domestic and municipal uses, (2) agriculture and livestock raising, (3) electric power, (4) other industrial uses, (5) navigation, (6) fishing and hunting, and (7) any other beneficial uses which may be determined by the [IBWC]."²⁴⁰ Article 3 of the Treaty required both governments to "give preferential treatment to the solution of all border sanitation problems."²⁴¹

Consistent with early empowering provisions,²⁴² the 1944 Water Treaty gave the IBWC jurisdiction to settle all disputes arising thereunder, subject to the approval of the two governments.²⁴³ The geo-

237. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande [1944 Water Treaty], Feb. 3, 1944, U.S.-Mex., art. 25, 59 Stat. 1219, T.S. 994 (effective Nov. 8, 1945).

238. See Neal E. Armstrong, *Anticipating Transboundary Water Needs and Issues in the Mexico-United States Border Region in the Rio Grande Basin*, 22 NAT. RESOURCES J. 877, 903-04 (1982) (presenting legal considerations addressed in 1944 Water Treaty).

239. See Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1095 (1982) (detailing apportionment of water supply). Professor Utton reports that the apportionment has been successful, but notes questions surrounding the drought provision as it effects apportionment on the lower Rio Grande. *Id.* at 1096-98. Although some commentators have taken the position that historically Mexico has suffered in such apportionments because of the heavy-handed negotiating stance of the dominant United States, no source material appears to support such statements. Indeed, since 1895, it seems equal apportionment has been clearly recognized as the proper principle of division. *Cf.* Mark A. Sinclair, Note, *The Environmental Cooperation Agreement Between Mexico and the United States: A Response to the Pollution Problems of the Borderlands*, 19 CORNELL INT'L L.J. 87, 109-11 (1986) (citing Kirsten J. Anderson, Note, *A History and Interpretation of the Water Treaty of 1944*, 12 NAT. RESOURCES J. 600, 607-13 (1972) which declares that Mexico suffered under United States influence).

240. Neal E. Armstrong, *Anticipating Transboundary Water Needs and Issues in the Mexico-United States Border Region in the Rio Grande Basin*, 22 NAT. RESOURCES J. 877, 903 (1982).

241. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande [1944 Water Treaty], Feb. 3, 1944, U.S.-Mex., art. 3, 59 Stat. 1219, T.S. 994 (effective Nov. 8, 1945).

242. Act of Mar. 1, 1889, 26 Stat. 1512.

243. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande [1944 Water Treaty], Feb.

graphic jurisdiction of the IBWC includes the relevant parts of the Colorado and Rio Grande Rivers, as well as the land boundary between the two countries.²⁴⁴

3. Minute 242

The decisions of the IBWC are recorded in the form of minutes, which are deemed approved by each government if no objection is communicated within thirty days.²⁴⁵ However, the minutes are not equivalent to a formal treaty but are considered executive agreements if both nations ratify them.²⁴⁶ Minute 242²⁴⁷ resolved a longstanding dispute between Mexico and the United States regarding the quality of waters delivered under the Treaty. As the Treaty contains no water quality provision, Mexicans have endured delivery of saline water. Under Minute 242, the United States agrees to deliver water to Mexico with no higher saline count than that received by Americans at the Imperial Dam.²⁴⁸ Mexico and the United States further agree to limit pumping within five miles of the border near San Luis.²⁴⁹ Ad-

3, 1944, U.S.-Mex., art. 3, 59 Stat. 1219, T.S. 994 (effective Nov. 8, 1945); see Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1094-95 (1982) (explaining IBWC's jurisdiction and role of United States and Mexican governments).

244. *Id.*

245. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande [1944 Water Treaty], Feb. 3, 1944, U.S.-Mex., art. 25, 59 Stat. 1219, T.S. 994 (effective Nov. 8, 1945).

246. See Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 515 (1982) (discussing role of minutes).

247. Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, IBWC Minute No. 242, Aug. 30, 1973, U.S.-Mex., 24 U.S.T. 1971.

248. See Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1098 (1982) (explaining agreement on water quality). The United States, invoking the Harmon Doctrine, refused to recognize a duty under international law to deliver unpolluted water absent treaty provision to the contrary. See generally Dale Beck Furnish & Jerry R. Ladman, *The Colorado River Salinity Agreement of 1973 and the Mexicali Valley*, 15 NAT. RESOURCES J. 83 (1975) (exploring problems of salinity agreement).

249. Mexico had planned a major oil field near the San Luis border with the capacity to extract 160,000 acre feet of water, the equivalent of one-tenth of the Mexican allotment of the Colorado, which would have placed United States groundwater reserves at peril. Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 505-06 (1980). Mumme further notes that subsequent to Minute 242, the United States undertook a pumping project within the five-mile zone and delivered such waters as part of the treaty allotment. *Id.*

ditionally, the agreement requires communication on "any new developments of either surface or groundwater resources."²⁵⁰

4. Minute 261

Minute 261 was issued as a response to a joint communiqué from Presidents Carter and Lopez-Partillo calling upon the IBWC to recommend permanent solutions to the sanitation of waters along the border.²⁵¹ It expands the authority of the IBWC to determine when a "border sanitation problem" exists.²⁵² Moreover, it strives to define broadly "border sanitation problems" to include: "Waters that cross the border . . . [h]ave sanitary conditions that present a hazard to the health and well-being of the inhabitants of either side of the border or impair the beneficial uses of these waters."²⁵³ This language has been described as "broad enough to cover the range of problems from salinity to toxic industrial wastes, and agricultural practices as well as municipal sewage."²⁵⁴ The language has been further interpreted to extend jurisdiction beyond the limited parts of the Rio Grande and Colorado Rivers dictated in the 1944 Water Treaty.²⁵⁵

Recommendation 4 of Minute 261 provides that the IBWC would prepare a Minute for each border sanitation problem, including:

Identification of the problem, definition of conditions which require solution, specific quality standards that should be applied, the course of action that should be followed for its solution, and the specific time

250. Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, IBWC Minute No. 242, Aug. 30, 1973, U.S.-Mex., 24 U.S.T. 1971, art.6.

251. Recommendations for the Solution to the Border Sanitation Problems, IBWC Minute No. 261, Sept. 24, 1979, U.S.-Mex., 31 U.S.T. 5100. The minute notes that this recommendation was the result of a Joint Communiqué issued February 16, 1979. *Id.*

252. *Id.* The consent of both governments is not required, eliminating potentially time-consuming political issues from interfering with such decisions. *Id.*

253. *Id.* Minute 261 gives such problems the highest priority. See Stephen P. Mumme, *The Background and Significance of Minute 261 of the International Boundary and Water Commission*, 11 CAL. W. INT'L L.J. 223, 223-24 (1981) (discussing Minute 261).

254. Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1105 (1982).

255. *Id.* Professor Utton writes:

To interpret the language of Minute 261 more narrowly would be to defy the hydrology of drainage basins and unduly limit the Commission's ability to identify and deal with water contaminants which reach or have an impact in the border region, but whose source is upstream in the drainage basin or even beyond . . .

Id.

schedule for its implementation.²⁵⁶

Despite the IBWC's historic tendency towards conservative measures,²⁵⁷ the IBWC has repeatedly cited Recommendation 4 over the past decade in a rather aggressive attempt to address border sanitation problems.²⁵⁸

B. *La Paz Agreement*

The 1983 Border Environmental Cooperation Agreement²⁵⁹ signed at La Paz, Baja California Sur, provides a general bi-national structure under which to address environmental problems.²⁶⁰ The Agreement names the environmental agencies of each nation "National Coordinators."²⁶¹ Working groups in water, air, and hazardous substances have since been established. The IBWC has been noted to "work closely" with the National Coordinators on water quality issues.²⁶²

Annex Agreements on specific problems have been signed, dealing with wastewater treatment facilities,²⁶³ accidental releases of hazardous substances,²⁶⁴ transboundary shipment of hazardous wastes and

256. Recommendations for the Solution to the Border Sanitation Problems, IBWC Minute No. 261, Sept. 24, 1979, U.S.-Mex., recommendation 4, 31 U.S.T. 5100.

257. See Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 513 (1980) (commenting on the IBWC's reluctance to involve itself in policymaking).

258. E.g., Recommendations for the First Stage Treatment and Disposal Facilities for the Solution of Border Sanitation Problems at San Diego, California-Tijuana, Baja California, IBWC Minute No. 270, Apr. 30, 1985, U.S.-Mex., T.I.A.S. 11267; Recommendations for the Solution of Border Sanitation Problem at Naco, Arizona-Naco, Sonora, Minute No. 273, Mar. 19, 1987, U.S.-Mex., T.I.A.S. 11,292.

259. Agreement for Cooperation for the Protection and Improvement of the Environment in the Border Area signed at La Paz [La Paz Agreement], Aug. 14, 1983, U.S.-Mex., T.I.A.S. 10827.

260. See Daniel I. Basurto Gonzalez & Elaine Flud Rodriguez, *Environmental Aspects of Maquiladora Operations: A Note of Caution for U.S. Parent Corporations*, 22 ST. MARY'S L.J. 659, 663-64 n.15 (1991) (noting key provisions of La Paz Agreement).

261. La Paz Agreement art. 3.

262. Robert D. Hayton and Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 685 (1989).

263. Annexes to Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area, Annex I, Agreement of the Cooperation for the Solution of the Border Sanitation Problem at San Diego, California-Tijuana, Baja California, July 18, 1985, U.S.-Mex., 26 I.L.M. 15, 18-19 (1987).

264. *Id.* at Annex II, Agreement of Cooperation Regarding Pollution of the Environment Along the Inland International Boundary by Discharge of Hazardous Substances, July 18, 1985, U.S.-Mex., 26 I.L.M. 15, 19-21 (1987).

hazardous substances,²⁶⁵ and air pollution.²⁶⁶ To date, no annex reaches groundwater issues.

V. FORMAT FOR IMPLEMENTATION OF PLAN

A. *Shortcomings of Existing Agreements*

1. Scope of 1944 Water Treaty

The Plan is based upon the implementation of solutions through existing legal framework.²⁶⁷ The first step, the gathering of data on contaminated and threatened aquifers, is clearly authorized under Minute 242 and has, in fact, been an ongoing process for a number of years by the IBWC.²⁶⁸ The cooperative programs for remedial solutions to groundwater contamination, which are to be developed by the EPA, the IBWC, the SEDUE, and the CNA,²⁶⁹ will likely need an alternative legal structure to be effective.

The 1944 Water Treaty creates a formula for distributing surface waters between Mexico and the United States. Although the Treaty defines water use priorities, it does not present a structure for comprehensive water management.²⁷⁰ The Treaty itself contains no language referring to water quality. The Treaty provision relating to "border sanitation problems"²⁷¹ has been narrowly interpreted by the IBWC.²⁷²

265. *Id.* at Annex III, Agreement of Cooperation Between the United States of America and the United Mexican States Regarding the Transboundary Shipments of Hazardous Wastes and Hazardous Substances, Nov. 12, 1986, U.S.-Mex., 26 I.L.M. 15, 23-32 (1987).

266. *Id.* at Annex IV, Agreement of Cooperation Between the United States of America and the United Mexican States Regarding Transboundary Air Pollution Caused by Copper Smelters Along Their Common Border, Jan. 29, 1987, U.S.-Mex., 26 I.L.M. 15, 33-37 (1987).

267. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-1 (1992).

268. See Albert E. Utton, *An Assessment of the Management of U.S.-Mexican Water Resources: Anticipating the Year 2000*, 22 NAT. RESOURCES J. 1093, 1115 (1982) (discussing Minute 242 and IBWC).

269. U.S. ENVTL. PROTECTION AGENCY & SECRETARIA DE DESARROLLO URBANO Y ECOLOGÍA, INTEGRATED ENVIRONMENTAL PLAN FOR THE MEXICAN-U.S. BORDER AREA (FIRST STAGE, 1992-1994) V-1 to V-54 (1992).

270. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande [1944 Water Treaty], Feb. 3, 1944, U.S.-Mex., art. 25, 59 Stat. 1219, T.S. 994 (effective Nov. 8, 1945). The Treaty list concerning international water places domestic and municipal uses over all other usage. *Id.*

271. *Id.* art. 3.

272. See Stephen P. Mumme, *The Background and Significance of Minute 261 of the*

Notwithstanding such previous interpretation, the IBWC negotiated Minute 261 which arguably extends IBWC jurisdiction over water quality issues.²⁷³ As any solution to groundwater contamination will necessarily include restrictions on pumping, it is also noteworthy that the IBWC successfully concluded Minute 242 which restricts pumping on both sides of the border.²⁷⁴

Plan solutions shall be shaped as answers to drinking water, water quality, and water supply problems. Remedial groundwater solutions fueled by sanitation and health concerns could be addressed by the IBWC on an interim basis in the form of minutes. Such minutes, albeit ostensibly limited by the geographic definitions of the Treaty itself, might be negotiated upon recognition of an imperiled or contaminated transboundary aquifer. Consistent with the IBWC's approach to border sanitation problems over the last decade, such a solution, though imperfect, may provide a reasonable avenue under the Plan, pending recognition of a comprehensive groundwater treaty. Given the slow pace of the negotiations between national and international legal regimes to integrate surface and groundwater, Professor Teclaff's prediction over a decade ago may prove to be quite insightful:

It is likely . . . that in international practice the areal unit of this coordinated management will be neither the river basin or the aquifer, but an artificial unit comprising both or parts of both, whose boundaries will be determined by the range of mutually felt effects of water use. The extent of groundwater pollution would then become an important, if not the most important, factor in establishing the areal limits of this international unified management of transfrontier water resources.²⁷⁵

The Minutes, however, have questionable binding authority, absent

International Boundary and Water Commission, 11 CAL. W. INT'L L.J. 223, 223 & 226 (1981) (suggesting that IBWC has sought to avoid controversy over propriety of its jurisdiction).

273. Recommendations for the Solution to Border Sanitation Problems, IBWC Minute 261, Sept. 24, 1979, U.S.-Mex., 31 U.S.T. 5100.

274. Mumme has stated that the United States has initiated pumping within the restricted five-mile zone. Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 506 (1980). The IBWC stated that no unauthorized pumping has taken place. Telephone Interview with Manuel Ybarra, Secretary of the IBWC, El Paso, Tex. (Dec. 1992).

275. Ludwik A. Teclaff, *Principles for Transboundary Groundwater Pollution Control*, 22 NAT. RESOURCES J. 1065, 1065 (1982).

specific authorization in the Treaty.²⁷⁶ Should the Plan solutions be framed in a Minute, they will be subject arguably to substantive, and perhaps persuasive, legal attack. Given the unbridled right to pump groundwater that Texans have enjoyed, it is highly predictable that a negotiated Minute affecting groundwater pumping in Texas will face the claims of an irate landowner that the Minute itself is invalid because the Treaty does not grant clear authority to so regulate groundwater.

2. Annex Under La Paz Agreement

The Plan firmly establishes that the IBWC will play a substantial role in solving all water problems. Consequently, negotiating an annex giving the IBWC—a creature of the Water Treaty—significant responsibility for implementing groundwater pollution control to resolve a “common problem in the Border Area”²⁷⁷ may be within the scope of the La Paz Agreement. The annex could be drafted to adopt a “Bilateral Coordination Scheme”²⁷⁸ similar to that proposed in the newly proposed Puerto Vallarta Draft Treaty.²⁷⁹ The central problem, however, will be the lack of a groundwater treaty from which to draw criteria. The annex might adopt the principles of the Bellagio Draft Treaty pending negotiation of a comprehensive groundwater treaty.

3. Other Troublesome Issues

The Plan notes the impact of hazardous waste on water quality. To control adequately that impact, restricted land zones on each side of the border may require designation. Additionally, because pesticide use has been cited as a source of contamination, both nations will likely need to demand increased regulation. Wastewater, tackled consistently by the IBWC, appears to require additional construction for

276. Stephen P. Mumme, *The U.S.-Mexican Conflict Over Transboundary Groundwaters: Some Institutional and Political Considerations*, 12 CASE W. RES. J. INT'L L. 505, 515 (1980).

277. Agreement for Cooperation and Improvement of the Environment in the Border Area at La Paz [La Paz Agreement], Aug. 14, 1983, U.S.-Mex., art. 3, T.I.A.S. 10827.

278. See Alberto Szekely, et al., *Transboundary Hydrocarbon Resources: The Puerto Vallarta Draft Treaty*, 31 NAT. RESOURCES J. 609, 639-45 (1991) (presenting coordination scheme).

279. See *id.* (discussing framework of Puerto Vallarta Treaty). The noted scholars who drafted the treaty state that their design technique was “directly taken from the 1983 La Paz Agreement for the Protection and Improvement of the Environment between Mexico and the United States which has already yielded significant Annexes.” *Id.* at 644.

proper control. These concerns raise the question of an enforcement body empowered with specific authority to manage a range of relevant issues. Actual regulation may be more desirably left in the hands of the sovereigns. Nonetheless, to address comprehensively the groundwater problems, the Plan's solutions must provide some mechanism to reach all appropriate elements of the contamination problems.

Moreover, as groundwater solutions will require pumping controls, it must again be noted that no treaty exists which deals either directly or indirectly with groundwater. The 1944 Treaty deals with surface water. "Mass balance" cannot be ignored. If pumping is prohibited as part of the solution to groundwater problems, allocated waters under the Treaty are certain to be affected.²⁸⁰ This problem, in itself, will require a firm legal framework. Moreover, resolution of pumping issues requires equitable allocation of groundwater use. As evidenced by Supreme Court decisions,²⁸¹ this doctrine is subject to varying interpretations. As such, allocation factors agreeable to both nations must be included in any proposal. To effectively provide for the necessary groundwater remedial solutions under the Plan, a new treaty must be negotiated. The existing legal framework does not contemplate the legal action required to gradually implement complete groundwater contamination remedial solutions.

With the historical conflicts in the legal doctrines governing groundwater, as well as the differing statutory bases of sovereign states, it is imperative that Mexico and the United States clearly delineate the legal jurisdiction to resolve groundwater issues. To finally approach determination of such difficult issues with a weak legal structure would only impede the first priority of the Plan.

B. *Adoption of Bellagio Draft Treaty*

Despite an increasing recognition of the world's reliance on a shrinking groundwater base,²⁸² few treaties deal specifically with

280. To argue application of hydrological principles to the treaty implies that specific language must be developed to regulate groundwater.

281. *Colorado v. New Mexico*, 459 U.S. 176 (1982); *Arizona v. California*, 373 U.S. 546 (1963); *Nebraska v. Wyoming*, 325 U.S. 589 (1945); *Washington v. Oregon*, 297 U.S. 517 (1936); *Wyoming v. Colorado*, 254 U.S. 419 (1922); *Kansas v. Colorado*, 206 U.S. 46 (1907); see Richard A. Simms, *Equitable Apportionment—Priorities and New Uses*, 29 NAT. RESOURCES J. 549, 551-62 (1989) (discussing doctrine of equitable allocation).

282. See Robert D. Hayton & Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 674-76 (1989) (discussing effects of diminish-

transboundary aquifers.²⁸³ Anticipating the need for a legal mechanism through which to resolve transboundary groundwater problems, scholars worked for eight years to draft an agreement which could be used as a realistic starting point.²⁸⁴ As the basis of the Treaty, the Bellagio drafters put forth the simple notion "that water rights should be determined by mutual agreement rather than be the subject of uncontrolled, unilateral taking, and that rational conservation and protection actions require joint resource management machinery."²⁸⁵ The Treaty utilizes three concepts to minimize any potential intrusion into a nation's sovereignty: (1) creation of zones where contamination or depleted recharge have reached critical stages; (2) enforcement through the home country's agencies with oversight by an international agency; and (3) limited substantive provisions, but full administrative powers to the international agency.²⁸⁶ The IBWC is likely the appropriate international agency since it has enjoyed a highly successful role resolving western border problems.

The Treaty specifically embraces the concept of applying an integrated approach to the "underground environment,"²⁸⁷ including "conjunctive use of surface water and groundwater in [the] border region."²⁸⁸ Accordingly, the proposed Comprehensive Management Plan demands consideration of hydrogeology.

Under the Treaty, Transboundary Groundwater Conservation Ar-

ing groundwater resources). Potential water shortage problems exist in the Middle East as well as Africa. *See id.* at 674-75 (noting groundwater shortages in Middle East and Africa).

283. *Id.* Hayton and Utton refer to the treaty between Poland and the USSR, which contains groundwater provisions. *Id.* at 159. *See* LUDWIK A. TECLAFF, *WATER LAW IN HISTORICAL PERSPECTIVE* 497-512 (1985) (discussing history of European groundwater pollution and treaties in modern times).

284. In 1978, Professor Utton proposed possible alternatives for management of such issues. *See* Albert E. Utton, *International Groundwater Management: The Case of the U.S.-Mexican Frontier*, 57 *NEB. L. REV.* 633, 640-45 (1978) (discussing four options for groundwater management). Scientific and legal scholars first met in Mexico in 1985 to draft a proposal which anticipated the Mexican-United States situation. *See* Ann Berkley Rodgers & Albert E. Utton, *Ixtapa Draft Agreement Relating to the Use of Transboundary Groundwaters*, 25 *NAT. RESOURCES J.* 713, 727-72 (1985) (outlining draft agreement). The most recent effort combines the work of earlier years, but includes adjustments. *See* Robert D. Hayton and Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 *NAT. RESOURCES J.* 663, 676-722 (1989) (outlining Bellagio draft agreement).

285. Robert D. Hayton and Albert E. Utton, *Transboundary Groundwater: The Bellagio Draft Treaty*, 29 *NAT. RESOURCES J.* 663, 664 (1989).

286. *Id.* at 664-65.

287. *Id.* at 677.

288. *Id.*

eas (TGCAs) could be designated based on threat or actual impairment of an aquifer.²⁸⁹ When designating TGCAs, the joint agency should consider “*sources and uses of water previously allocated by agreement between the Parties or under the Drought Management Plan.*”²⁹⁰ The Official Comments indicate the drafters wanted to make certain that determinations were consistently based on clearly discernible factors and were in context to that region.²⁹¹

The Comprehensive Management Plans for the TGCAs may, in an attempt to eliminate, prevent, or mitigate degradation of the groundwater quality, “allocate uses of groundwater and interrelated surface waters taking into account previous allocations in the TGCA.”²⁹² The factors to be considered in “allocation of the uses of groundwater and interrelated surface waters”²⁹³ include:

- a. hydrogeology and meteorology;
- b. existing and planned uses;
- c. environmental sensitivity;
- d. quality control requirements;
- e. socio-economic implications (including dependency);
- f. water conservation practices (including efficiency of water use);
- g. artificial recharge potential; and
- h. comparative costs and implications of alternative sources of supply.

The weight to be given each factor is to be determined by its importance in comparison with that of the other relevant factors.²⁹⁴

Allocation, thus, may include consideration of water allotments

289. See Robert D. Hayton & Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 692 (1989) (providing contents of Article VII of Bellagio Draft Treaty).

290. *Id.* at 693.

291. *Id.* at 694-95 (presenting Official Comments 5 and 6 concerning Article VII of the Treaty).

292. *Id.* at 696.

293. Robert D. Hayton & Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 696 (1989) (Art. VII, paragraph 2b).

294. *Id.* at 696-97. It is important to note that such factors have become accepted internationally since the adoption of the Helsinki Rules on the Uses of the Waters of International Rivers by the International Law Association in 1966. Two Helsinki factors are excluded from this list:

- (j) the practicability of compensation to one or more of the co-basin states as a means of adjusting conflicts among uses; and
- (k) the degree to which the needs of a basin state may be satisfied without causing substantial injury to a co-basin state.

Id. at 699-701 (Official Comment to Art. VII of Treaty citing International Law Association, Helsinki Rules on the Uses of the Waters of International Rivers (Article V, London 1967)).

under the 1944 Water Treaty and may anticipate interim adjustments in those allocations as necessary to protect the aquifer. Therefore, provision is made for hydrological principles and legal interference with 1944 Water Treaty allotments.

Moreover, the Management Plans permit the "establishment of protective zones in which land use may be regulated."²⁹⁵ The Draft Treaty, commendable in its comprehensive approach to transboundary groundwater issues, would permit implementation of the solutions anticipated by the Plan.

C. *The Draft Treaty and the Border Plan*

1. Common Elements

The Border Plan and the Bellagio Draft share similar approaches. Both favor use of an international agency for oversight, the IBWC.²⁹⁶ Rather than applying a generalized approach, both prefer studying and identifying troubled aquifers and limiting solutions to those zones. Management and enforcement through the IBWC, though not specifically indicated in the Plan, appears implicit. Although the Plan may have deliberately shaped groundwater issues in border sanitation-water quality terms so as to more neatly fall within the 1944 Water Treaty and Minute 261, the reach of those agreements is insufficient to allow for the complexities of water allocation and land use.

2. Use Allocation

The Draft Treaty is premised on water use allocation considering the listed factors by the IBWC. Such allocation necessarily dictates value judgments by the IBWC; however, the IBWC has historically shied away from politically controversial issues.²⁹⁷ The indubitably

295. Robert D. Hayton & Albert E. Utton, *Transboundary Groundwater: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 696 (1989) (discussing Article VIII of Treaty).

296. Robert D. Hayton & Albert E. Utton, *Transboundary Groundwater: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663, 665 (1989). The Bellagio Draft declares that the IBWC should be given the authority to determine critical areas along the Mexican-United States border. *Id.*

297. See Helen M. Ingram, *State Governments Officials' Role in U.S.-Mexico Transboundary Resource Issues*, 28 NAT. RESOURCES J. 431, 441 (1988) (noting action by the IWBC); Stephen P. Mumme & Scott T. Moore, *Agency Autonomy in Transboundary Resource Management: The United States Section of the International Boundary and Water Commission, United States and Mexico*, 30 NAT. RESOURCES J. 661, 663-76 (1990) (examining organizational politics under IBWC).

complex issues relating to such water allocation decisions underscore the need for clear-cut treaty language, coupled with appropriately delineated management powers.²⁹⁸

Balancing allocation issues in a transboundary situation is complicated by sovereign sensitivities and is challenged when emphasis on different economic sectors varies between the countries. Further adding to the complexity is the national and cultural heritage of Mexico that fosters the belief that the right to water is fundamental.

The Draft provides that once transboundary allocations are made, water allotments are to be managed by each sovereign, which would recognize, absent federal groundwater legislation, the border states' right to distribute and manage such water based on home legal regimes. Should such allotments interfere with previous allocation under the 1944 Treaty, the states must coordinate usage. This arrangement may well have the laudable effect of forcing hydrogeologic reality into the legal systems of recalcitrant states. It also may result in creating the least amount of disruption in each sovereign's legal regime.

On the United States side of the border, changing legal doctrines have threatened the previously well-recognized sovereignty states have over water.²⁹⁹ Changing priorities have recently persuaded the courts that the doctrine of equitable apportionment may shift the emphasis from protecting existing economic uses to protecting planned uses. Intrusion of federal environmental statutes upon state management of waters has begun to entangle even more deeply state water allocation issues.³⁰⁰ In allocation decisions, the IBWC must not be placed in the awkward position of inherently resolving interstate conflicts as well as international conflicts.

298. The current dispute over American interpretation of the 1944 Treaty and Minute 242 gives evidence of the difficulties which arise under Treaties which do not consider hydrology. See John H. Coghlin, *All American Canal Project Sparks Test Case for Transboundary Groundwater Law*, 14 B.C. INT'L & COMP. L. REV. 159, 174-76 (1991) (discussing problems with 1944 Water Treaty and Minute 242).

299. Charles P. DuMars & A. Van Tarlock, *New Challenges to State Water Sovereignty*, 29 NAT. RESOURCES J. 331, 334-36 (1989) (reviewing interference by judicial actions, federal programs, and economic pressures).

300. See generally Kevin M. O'Brien, Comment, *New Conditions for Old Water Rights: An Examination of the Sources and Limits of State Authority*, 33 ROCKY MTN. MIN. L. INST. § 24 (1960) (discussing efforts to allocate water use).

3. Impact of the American Conflict

Internal disputes within the United States will probably threaten a proposal to adopt a Bellagio-type treaty. Water allocation in the western states, traditionally controversial, will become undeniably the most hotly-debated political and legal issue in the next century. The Supreme Court has indicated flexibility not only in determining equitable allocation, but also in limiting states' sovereign rights.

D. *The American Conflict*

Recent court cases demonstrate that the judiciary lacks enthusiasm for unlimited state control of state water resources.³⁰¹ As the Court moves away from the traditional recognition of state ownership of water as an extension of the police power, states are placed in a tenuous position regarding use and conservation of its own resources. Without a federal statute recognizing groundwater conservation and management as a priority, the Supreme Court has been placed in the position of superficially dealing with a complex problem. This superficial treatment is particularly troublesome when the issue of in-stream appropriation of surface waters arises and is not considered in a hydrological context.³⁰²

As supplies diminish and costs escalate, pressure has mounted to consider water as an economic commodity. The Court has indicated it will recognize state authority to manage the wealth of such water markets. Therefore, it would appear that the tenacity of United States border states to adhere to outdated property right notions, and the concomitant lack of state and federal legislation regulating groundwater, will enhance a federal court view of water as a commodity subject to the commerce clause.³⁰³ As environmentalists and conser-

301. *E.g.*, *Sporhase v. Nebraska*, 458 U.S. 941 (1982). *Sporhase* was the Supreme Court's first attempt to deal with groundwater disputes. See Albert E. Utton, *In Search of an Integrating Principle for Interstate Water Law, Regulation and the Market Plan*, 25 NAT. RESOURCES J. 985, 986 (1985) (describing *Sporhase* as first groundwater case). See generally *id.* (suggesting balanced and integrated approach to interstate water law).

302. See generally Brian E. Gray, *A Reconsideration of Instream Appropriative Water Rights in California*, 16 ECOLOGY L.Q. 667 (1989) (urging recognition of instream appropriative water rights); Margaret Z. Ferguson, Comment, *Instream Appropriations and the Dormant Commerce Clause: Conserving Water for the Future*, 75 GEO. L.J. 1701 (1987) (recommending states adopt statutes securing water rights).

303. See generally Arthur H. Chan, *To Market or Not to Market: Allocation of Water Rights in New Mexico*, 29 NAT. RESOURCES J. 629 (1989) (addressing competitive water markets); Bonnie G. Colby, *Economic Impacts of Water Law-State Law and Water Market Devel-*

vationists are acutely aware, the use of market forces to regulate water may threaten to eliminate seemingly non-economic uses. Arguably, this economic view of water may encourage further development if courts grant municipalities priority usage.

The American conflict over water usage must, however, be subordinated to the Plan's consideration of groundwater. Domestic turmoil should be recognized as such, and should not be permitted to interfere with the adoption of a legally sufficient framework to address transboundary management of aquifers.

VI. CONCLUSION

The Border Plan is commendable because it publicly recognizes the need to study the imperiled border aquifers to offer remedial resolutions. Moreover, it embraces hydrological principles in approaching drinking water supply problems, thereby forcing both sides of the border to recognize mass balance.

Resolution of the aquifer issue at the border will demand participation of the states, regardless of their conflicting statutory frameworks and common law doctrines. Without a federal statute prioritizing groundwater usage and creating integrated management, each state will be left to represent its citizens in the most vociferous of legal arenas. It is water which will force all citizens of all nations to recognize the very real physical limitations of the planet. Though frustrated and angry, all citizens must make choices to prioritize longevity of the human race. Accordingly, the legal system must provide a framework by which to accomplish that goal. Courts and legislators must eliminate age-old myths of the mysterious nature of waters and recognize hydrology.

Arguments over the proper legal doctrine to apply to the issue of pumping rights revolve in a current of outdated legal analysis, an analysis emphasizing property rights instituted during expansionist eras but now being applied to a shrinking planet. The introduction of water marketing as a leveling mechanism should provoke the serious concern not only of municipalities attempting to provide safe and inexpensive drinking water, but also forward-thinking leaders searching for a future food supply and conservationists fighting to protect the

opment in the Southwest, 28 NAT. RESOURCES J. 721 (1988) (discussing water markets and water transfers).

environment and whose values, although priceless, represent an elusive economic value in dollar-related water rights schemes. Additionally, the impact of a water market-based approach on one side of the border, versus a fundamental rights approach on the other side, could create future complications for establishing equitable water-use allocations.

Given the turmoil and complexity of the domestic legal regimes surrounding groundwater, the Bellagio Draft Treaty should be adopted to accomplish the worthy groundwater goals of the Border Plan. This approach, when enforced by the sovereign states, will be more tenable because it causes the least disruption. Although man is not yet ready to reacknowledge that water belongs to no one, and certain sovereign states are not willing to recall ancient equitable principles upon which water distribution was historically based, the governments of the United States and Mexico have nonetheless rather remarkably agreed that protection of groundwater is now imperative. The thorny legal dilemma of groundwater under the Plan must be resolved by adopting an appropriate treaty. The Bellagio Draft merits, at a minimum, serious consideration as the basis of negotiation between the two nations.