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Underground Water: A Fugitive at the Border

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"In bringing industrialization to the border, we are also in the process of creating the longest Love Canal and Superfund site on planet [E]arth."[2]

I. Introduction

An astounding ninety-four percent of the Earth's water lies in its highly saline oceans and seas.[3] Only the remaining six percent is fresh water, and of this, two-thirds is groundwater.[4] If unusable fresh water resources, such as icecaps and glaciers, are removed from consideration, a full ninety-five percent of the world's usable fresh water resources is groundwater. Surface water comprises a mere three and one-half percent of fresh water resources.[5] Moreover, ground-

1. The term "fugitive" for groundwater was used by Albert E. Utton. *See* Albert E. Utton, *International Groundwater Management: The Case of the U.S.-Mexican Frontier*, 57 NEB. L. REV. 633, 638 (1978) (quoting Ciriacy & Wantrup, *Concepts Used as Criteria for a System*, *in* ECONOMICS AND PUBLIC POLICY IN WATER RESOURCE DEVELOPMENT 251-71 (S. Smith & E. Castle eds., 1964)).

* The author thanks the PELR staff for its patience, diligence, and effort while working to elucidate some rather nebulous phrases and concepts.

2. Hector Fuentez, Associate Professor at the University of Texas at El Paso, *quoted in Transboundary Pollution: Joint U.S., Mexican Manufacturing Program May Be Causing Pollution in Texas, Arizona*, 12 Int'l Env't Rep. (BNA) No. 6, 306, 308 (June 14, 1989) [hereinafter *Transboundary Pollution*].

3. R. ALLAN FREEZE & JOHN A. CHERRY, GROUNDWATER 5 (1979). One estimate of saltwater as a percentage of the world's water is as high as ninety-seven percent. Peter H. Gleick, *An Introduction to Global Fresh Water Issues*, *in* WATER IN CRISIS: A GUIDE TO THE WORLD'S FRESH WATER RESOURCES 3 (Peter H. Gleick ed., 1993). According to this estimate, only 0.3 percent of all freshwater is surface water. *Id.*

4. FREEZE & CHERRY, *supra* note 3, at 5.

5. *Id.* An estimated 68.7 percent of freshwater is in the form of ice and permanent snow cover in the Arctic and Antarctic. Igor A. Shiklomanov, *World*

water shares a critical hydrological relationship with surface water and is therefore essential to the natural geological balancing of the earth.[6] Geological science has revealed that groundwater operates distinctly from surface water as a nonrenewable resource,[7] and groundwater is only a part of the subterranean reservoir.[8]

Because groundwater flows freely across international boundaries, the integrity of groundwater is an international concern.[9] When polluted groundwater flows beyond a nation's borders, issues of transboundary liability arise.[10] The potential for international groundwater disputes is especially acute at the borderlands between the United States and Mexico.[11]

Fresh Water Resources, *in* WATER IN CRISIS, *supra* note 3, at 13. This water is in the form of lakes, swamps, reservoirs, and river channels. FREEZE & CHERRY, *supra* note 3, at 5. The remaining 1.5 percent of usable fresh water consists of soil moisture. *Id.*

6. *See* TIMOTHY R. HENDERSON ET AL., GROUNDWATER: STRATEGIES FOR STATE ACTION 2-4 (1984).

7. A. DAN TARLOCK ET AL., WATER RESOURCE MANAGEMENT 647 (4th ed. 1993).

8. *Id.* at 484.

9. LUDWIK A. TECLAFF & ALBERT E. UTTON, INTERNATIONAL GROUNDWATER LAW 9 (1981).

10. "Transfrontier pollution includes disturbances that originate in one country, are transmitted through a shared natural resource, and take effect on another . . . ." Stephen C. McCaffrey, *Pollution of Shared Natural Resources: Legal and Trade Implications*, *in* 71 AM. SOC'Y INT'L L. PROC. OF THE 71ST ANNUAL MEETING 56, 56 (James A. R. Nafziger ed., 1977). *See also* Oscar Schachter, *The Emergence of International Environmental Law*, 44 J. INT'L AFF. 457, 464 (1990). To construe an international environmental tort, the harm (pollution) must result from a "physical consequence of [a] causal human activity." *Id.* Furthermore, the physical harm must cross international boundaries and "must be significant or substantial." *Id.*

11. *See*, U. S. ENVIRONMENTAL PROTECTION AGENCY (EPA), PUB. NO. ___, EPA SUMMARY: ENVT'L PLAN FOR THE MEXICAN-U.S. BORDER AREA, FIRST STAGE (1992-1994) 11-12 (1992) [hereinafter EPA SUMMARY]. *But see* Robert D. Hayton, *Institutional Alternatives for Mexico-U.S. Groundwater Management*, *in* INTERNATIONAL GROUNDWATER LAW 135 (1981)("[T]he record of cooperation and collaboration between these two sovereign states, though not without its more difficult periods, is an outstanding one.").

Since 1965, rapid industrialization and population growth spurred by the *maquiladora* program have burdened the water resources at the border. EPA SUMMARY, *supra*, at 8. For an explanation of the *maquiladora* program, *see infra* note 267.

In the past decade, rapid industrialization and development at the border has resulted in intense groundwater depletion and pollution.[12] However, neither the United States nor Mexico has adequate superstructural, statutory, and enforcement capabilities to fully combat pollution.[13] Instead, both nations are subject to a complex maze of statutes, doctrines, and enforcement processes that only partially address international groundwater pollution.[14] General water policy between the nations is directed according to the principles set forth in several treaties and conventions.[15]

Until 1995, the United States and Mexico operated according to the Integrated Environmental Border Plan (IEBP). The IEBP expresses the joint commitment to protect and improve the environmental quality of the borderlands.[16] The first stage of the IEBP expired on December 31, 1994, and, since no subsequent stages of the IEBP have been implemented, its binding effect as a joint agreement remains un-

12. *See infra* part IV.

13. Although both the United States and Mexico address groundwater pollution in various documents, *see infra* part IV, neither of the countries have a comprehensive groundwater law. *See infra* parts III, V, and VI.B.

14. *See infra* part III.

15. *See infra* note 16. *See also, e.g.*, Convention on Boundary Waters: Rio Grande and Rio Colorado, March 1, 1889, U.S.-Mex., 26 Stat. 1512 [hereinafter Rio Grande Convention]; The 1944 Treaty Relating to the Utilization of the Colorado and Tijuana Rivers and of the Rio Grande, Feb. 3, 1944 [hereinafter 1944 Treaty], U.S.-Mex., 59 Stat. 1219; Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, International Boundary and Water Commission (IBWC) Minute No. 242, August 30, 1973, U.S.-Mex., 24 U.S.T. 1971, [hereinafter Minute No. 242]; Agreement Between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area, Aug. 14, 1983, U.S.-Mex., T.I.A.S. No. 10,827 [hereinafter La Paz Agreement]. *See generally* U.S. Environmental Protection Agency (EPA) and Secretaria de Desarrollo Urbano y Ecologia (SEDUE), Integrated Environmental Border Plan For the Mexico-United States Border Area (1st Stage 1992-1994) [hereinafter IEBP].

16. IEBP, *supra* note 15. The IEBP is a proposed draft treaty which expresses the commitment of the United States and Mexico to protect and improve the quality of the environment at the border. *Id.* The IEBP does not meet treaty status, and is not binding upon either country under general international law principles. For a further discussion of the IEBP and international legal principles, *see infra* part IV.

clear.[17] As of January 1995, pollution along the border area between the United States and Mexico has been addressed most directly by the North American Free Trade Agreement Draft Environmental Side Accord (NAFTA Environmental Side Accord).[18] The Border Environmental Cooperation Commission (BECC) evaluates border infrastructure proposals that are submitted to the North American Development Bank (NADBANK).[19] However, neither these institutions nor the NAFTA Environmental Side Accord have groundwater protection as their primary focus.[20]

All of the other treaties or agreements between the United States and Mexico address groundwater protection. However, not one treaty contains specific measures to prevent future groundwater pollution or provides measures for remediation of currently polluted aquifers.[21] Furthermore, problems of enforcing existing pollution regulations are more procedurally and financially difficult now than when the IEBP was in effect.[22]

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17. *Id.* According to the EPA and SEDUE, subsequent stages of the IEBP will be developed according to analyzed needs at the border. *Id.*

18. *See North American Free Trade Agreement Draft Side Accord on Environment*, Daily Report For Executives, Sept. 13, 1993, *available in* WESTLAW, 1993 DER 175 at d70 [hereinafter *NAFTA Side Accord*].

19. Stephen P. Mumme, The North American Commission for Environmental Cooperation: Towards A Working Agenda For The First Three Years With Emphasis on the U.S.-Mexico Border Area, Paper Prepared For A Planning Meeting On Transboundary Issues, North American Commission for Environmental Cooperation 7-9 (Nov. 1994) (on file with author). The Border Environmental Cooperation Commission (BECC), established on January 1, 1994, operates in conjunction with the International Boundary and Water Commission (IBWC) in helping to "develop water remediation projects and water management infrastructure in the border area." *Id.*

20. *Id.*

21. Farah Khakee, *The North American Free Trade Agreement: The Need to Protect Transboundary Water Resources*, 16 FORDHAM INT'L L.J. 848, 849 (1992-1993).

22. ALEXANDRE KISS & DINAH SHELTON, INTERNATIONAL ENVIRONMENTAL LAW 223 (1991). "Unmanaged drilling of groundwater in the El Paso/Cuidad Juarez area threatens exhaustion of the resource by the year 2000." *Id.* The IEBP's Stage One expired on December 31, 1994, and no subsequent stages or clear line of pollution dispute settlement has been established since. *See supra* note 17.

One solution, proposed by several eminent water and political science scholars, is to adopt the 1989 Bellagio Draft Treaty.[23] The acceptance of an updated treaty by the United States and Mexico would create a regulatory foundation upon which groundwater could be more adequately protected. However, absent an accompanying statutory framework through which to impose penalties or liability and cleanup procedures, the adoption of this treaty alone may not adequately address the growing pollution problems in the borderlands.

This comment argues that the recent expiration of the IEBP, the lack of a bilateral groundwater treaty, and the potential environmental disasters at the Mexican border compel immediate concern for the preservation of potable groundwater at the border. Part II of this comment provides a brief background of groundwater and its importance. Part III examines the present legal avenues in the United States and Mexico for groundwater protection. Part IV discusses the impact of international environmental law on groundwater. Part V reviews the binding bilateral agreements between the United States and Mexico. Part VI considers the continuing pollution and enforcement problems at the borderlands. Part VII proposes possible solutions for these problems. Finally, this comment concludes that the legal provisions for protecting groundwater are deficient, and that a stronger commitment to the preservation of groundwater must be established through a three part scheme. First, an effective bilateral treaty must be accepted; second, a joint commission dedicated solely to protecting the unseen reservoirs must be established; and third, comprehensive groundwater legislation holding polluters strictly liable for groundwater pollution, and compelling polluters to pay for purification costs of polluted reservoirs and aqueducts must be enacted. Without such a binding scheme to restrict pollution of groundwater, the potential for catastrophic environmental harm more dev-

23. *See* Bellagio Treaty, *infra* part VII. *See also* Robert D. Hayton & Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RESOURCES J. 663 (1989) [hereinafter *Transboundary Groundwaters*].

astating than Love Canal is not only possible, but inescapable.

II. A Background of Groundwater

For centuries, groundwater has been a vital drinking and irrigation source, necessary for agriculture and the growth of civilization.[24] Even today, vast modern urban centers draw much of their water from underground aquifers.[25] Groundwater comprises the majority of free-flowing, fresh water available to human beings.[26] Ninety percent of the populations of Tunisia and Belgium rely on groundwater.[27] Two-thirds of all water used in Israel is groundwater, and three-fourths of the public water supply of Denmark, the Federal Republic of Germany, and the Kingdom of the Netherlands is extracted from underground aquifers.[28] The United States draws forty-five percent of its drinking water from groundwater.[29]

Groundwater is "subsurface water that lies beneath the water table."[30] "Pure" groundwater exhibits many desirable qualities, including "clarity, bacterial purity, consistent temperature, and chemical quality."[31] These qualities make

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24. For a comprehensive background of international groundwater law, *see* Albert E. Utton, *The Development of International Groundwater Law*, *in* INTERNATIONAL GROUNDWATER LAW 1-3 (1981).

25. HENDERSON ET AL., *supra* note 6, at 7.

26. Stephen C. McCaffrey, *The Non-Navigational Uses of International Watercourses*, *in* 84 AM. SOC'Y INT'L L. PROC. OF THE 84TH ANNUAL MEETING 228 (George Denney ed., 1991).

27. *Transboundary Groundwaters*, *supra* note 23, at 674.

28. *Id.*

29. James T. B. Tripp & Adam B. Jaffe, *Preventing Groundwater Pollution: Towards a Coordinated Strategy to Protect Critical Recharge Zones*, 3 HARV. ENVTL. L. REV. 1 (1979).

30. HENDERSON ET AL., *supra* note 6, at 2. Beneath the surface of the earth lie zones of saturation and zones of aeration. TARLOCK ET AL., *supra* note 7, at 484. Groundwater is found below the zone of aeration, in the zone of saturation. *Id.* The size of the zones is variable; the zone of saturation may extend to the surface, and the zone of aeration may be inches or hundreds of feet thick. *Id.* The water table may extend up to the top of the zone of saturation. *Id.* at 484.

31. FREEZE & CHERRY, *supra* note 3, at 8, *citing* McGuiness, *The Role of Groundwater in the National Water Situation*, U.S. Geol. Surv. Water-Supply Paper 1800 (1963).

groundwater especially desirable as a source of drinking water.[32]

Groundwater movement is determined by rock porosity[33] and soil zones.[34] Rock formations that allow sufficient groundwater movement and collection to occur are called aquifers.[35] An aquifer is "best defined as a saturated permeable geological unit that can transmit significant quantities of water under ordinary hydraulic gradients."[36] Groundwater and surface water have a complex interrelationship, each discharging into and recharging from the other.[37] Groundwaters that continually recharge are characterized as flow resources.[38] If flow resources are depleted too quickly, the groundwater supply may become exhausted.[39] An aquifer with little or no recharge is considered a stock resource, an exhaustible commodity.[40]

Mexico and the United States share underground aquifer basins connected to the Rio Grande, and the Colorado, Tijuana, Santa Cruz, and New Rivers.[41] While many of the aquifers at the border are flow resources, the increased demands upon these aquifers may have disastrous consequences for them and the rivers associated with them.[42] A plan for managed extraction is thus crucial for the preservation of these areas.

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32. HENDERSON ET AL., *supra* note 6, at 7.

33. Underground openings are considered pores, and they vary in shape, size or arrangement. TARLOCK ET AL., *supra* note 7, at 486.

34. FREEZE & CHERRY, *supra* note 3, at 7. Soil zones are fields of soil through which groundwater flows. *Id.*

35. TARLOCK ET AL., *supra* note 7, at 486. An aquifer may range in size from a few feet to hundreds of yards deep, and may also be referred to as a reservoir. *Id.*

36. FREEZE & CHERRY, *supra* note 3, at 47.

37. *See* HENDERSON ET AL., *supra* note 6, at 4. Groundwater discharges into surface water comprise thirty percent of the volume of surface stream flow in the United States. *Id.*

38. Utton, *supra* note 1, at 657.

39. *Id.*

40. *Id.*

41. M. Diane Barber, *The Legal Dilemma of Groundwater Under the Integrated Environmental Plan for Mexico-United States Border Area*, 24 ST. MARY'S L.J. 639, 680 (1993).

42. *Id.*

III. The Current Legal Status of Groundwater Within the United States and Mexico

A. American Water Law

Despite the interstate nature of groundwater and the potential for conflict between state laws regulating groundwater use and protection, no federal statute exists that has groundwater protection as its primary objective.[43] However, several federal statutes protect groundwater peripherally.[44] Underlying this patchwork of federal statutes are a number of groundwater protection doctrines that individual western states have developed and codified.[45] The overall effect of this regulatory jumble is that the United States lacks an overarching and uniform groundwater protection policy, resulting in the inefficient use and waste of a valuable resource.[46]

1. Federal Law

a. The Clean Water Act

In 1972, Congress passed the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), with the express objective "to restore and maintain the chemical, physical and biological integrity of the Nation's waters."[47] Although section 102 of the CWA requires development of "comprehensive programs for preventing, reducing or eliminating the pollution of the navigable waters and ground waters and improving the sanitary condition of surface and underground waters,"[48] the federal courts have interpreted the CWA to apply primarily to surface waters.[49] Under sections 301 and 304 of the CWA, Congress authorized the Envi-

43. LARRY MORANDI, STATE GROUNDWATER PROTECTION POLICIES: A LEGISLATOR'S GUIDE 7 (Sharon Schwoch ed., 1989).

44. *Id.*

45. *Id.*

46. *Id.* at 7.

47. CWA § 101(a), 33 U.S.C. § 1251(a) (1988 & Supp. 1990).

48. *Id.*

49. *See* Jeffrey G. Miller and Nancy L. Long, Introduction to Environmental Law, v. 1, ch. 3, 45 (Fall 1995) (unpublished manuscript, on file with Professor Jeffrey G. Miller at Pace University School of Law).

ronmental Protection Agency (EPA) to establish guidelines for national water quality standards.[50]

Of particular interest to transboundary disputes is section 310, entitled "International Pollution Abatement."[51] Under section 310(a), the EPA may bring suit against American companies producing pollution within the United States when that pollution subsequently "endangers the health or welfare of persons in a foreign country."[52] Under section 310(a), United States' courts have power, through the EPA, to award damages to foreign nations for causes of action originating in the United States.[53] To recover damages, the EPA must make an "endangerment finding," to show that a causal connection exists between the pollution originating in the United States and the injury in the foreign nation.[54] Moreover, the EPA must also make a "reciprocity finding," a finding that the foreign state confers equal recovery power on the United States for injuries from pollution originating within the foreign nation's boundaries.[55] To date, section 310(a) of the CWA remains "a lame duck," as it has yet to be employed in an international case.[56]

b. The Resource Conservation and Recovery Act

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA). Originally, RCRA was implemented to address the problems created by the CWA and the Clean Air

50. CWA §§ 301, 304, 33 U.S.C. §§ 1311, 1314.

51. CWA § 310, 33 U.S.C. § 1320.

52. CWA § 310(a), 33 U.S.C. § 1320(a).

53. *Id.*, 33 U.S.C. § 1320(a). *See also* Khakee, *supra* note 21, at 862. *But see* Corfu Channel Case (U.K. v. Alb.), 1949 I.C.J. 4 (Judgment of Apr. 9) (establishing the principle of sovereign immunity upon notice of an injury to an international waterway); Foreign Sovereign Immunities Act, 28 U.S.C. §§ 1602-1611 (1988 & Supp. 1990) (establishing the principle that foreign nations may avoid liability through the act of state doctrine).

54. Khakee, *supra* note 21, at 862.

55. *Id.*

56. *Id.* (discussing the implementation of the reciprocity and endangerment findings under CWA sections 310(a) and 505(a) as methods of complying with international standards of transboundary water pollution).

Act;[57] since polluters could no longer pollute water or air, polluters turned to dumping wastes into landfills. RCRA was designed to force planning and management practices for land disposal.[58] However, RCRA only provides regulation for certain wastes, and excludes solids or dissolved materials in domestic sewage, irrigation return flows, industrial point sources subject to the CWA, nuclear wastes, exploration and production wastes, and certain mining wastes.[59]

In the RCRA process, facilities must obtain permits to handle solid or hazardous wastes.[60] RCRA protects groundwater by restricting the generation of leachate and by creating a method of removing leachate before it enters the soil and groundwater.[61] Moreover, RCRA allows the Administrator to bring suit if any handling of solid or hazardous waste presents an "imminent and substantial endangerment to health or the environment."[62]

c. The Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was enacted in 1974 to protect and ensure drinking water quality.[63] Congress created the SDWA to provide sanitary water supplies, to protect aquifers, and to control the injection of wastes into subsurface waters.[64]

The Underground Injection Control program under the SDWA prohibits the disposal of hazardous wastes into underground drinking water sources.[65] Permits to inject waste into nearly impenetrable wells are available, but the permittee must certify that the injection will not endanger water

57. RUTH PATRICK ET AL., GROUNDWATER CONTAMINATION IN THE UNITED STATES 371 (2d ed. 1987).
58. *Id.*
59. *Id.* at 372.
60. *See* Resource Conservation and Recovery Act (RCRA) § 1002, 42 U.S.C. § 6901 (1988 & Supp. 1990).
61. PATRICK ET AL., *supra* note 57, at 375.
62. *Id.* at 377.
63. Safe Drinking Water Act (SDWA), 33 U.S.C. §§ 300f to 300j-26 (1974 & Supp. 1988).
64. PATRICK ET AL., *supra* note 57, at 382.
65. *Id.*

sources.[66] In this way, the SDWA enables the EPA to protect sole source aquifers from contamination.[67] A sole source aquifer is one that is the only principal source of drinking water for an area.[68] Once designated by the EPA, no new underground injection wells can be drilled without a permit.[69] Finally, the SDWA, like RCRA, has an imminent hazard provision, under which the EPA or the public can prosecute violators.[70]

2. State Law

The states address their surface water law through a combination of two doctrines: riparian rights and prior appropriation.[71] The riparian system, practiced for the most part in the eastern states, bases water rights on ownership of the land on which, or through which, the water flows.[72] These landowners own correlative rights in the water; that is, they must share equally in times of shortage.[73] Even in times of plenty, riparian users have a duty to use the water reasonably and not to harm the other users.[74] The question of reasonableness is largely a court-decided issue, and is based on general tort principles.[75]

In the western states, where water is much less plentiful, water allocation has generally followed a system of priority of use apart from ownership of the surrounding land.[76] This system, called prior appropriation, allows people and busi-

66. *Id.* at 383.
67. *Id.*
68. PATRICK ET AL., *supra* note 57, at 383.
69. *Id.*
70. *Id.*
71. TARLOCK ET AL., *supra* note 7, at 3.
72. *Id.*
73. *See id.* at 3, 52-53.
74. *Id.* at 90.
75. TARLOCK ET AL., *supra* note 7, at 94. The Restatement Second of Torts section 850A sets out factors relevant to reasonable use in the riparian doctrine, including the purpose and suitability of the use, its economic and social values, the nature and extent of the harm caused to other users, the practicability of avoiding the harm, and the equitable principle of "requiring the user causing harm to bear the loss." RESTATEMENT (SECOND) OF TORTS § 850A (1977 & Supp. 1995).
76. *See* TARLOCK ET AL., *supra* note 7, at 3, 149-391.

nesses in completely dry areas to have access to water.[77] The doctrine dictates that first users take priority over later appropriators and do not have to share in times of shortage.[78] All users, however, must make a beneficial use of all of their recorded water rights, and cannot let the water sit idle or be wasted.[79] This requirement ensures the maximum efficient use of surface water.[80]

Most states have since departed from strict adherence to their original water doctrines, and have passed statutes creating water permit systems and state water management agencies to apply and enforce the statutes.[81] These agencies generally do not address issues of water quality or pollution, despite the relationship between water quantity and quality.[82]

Historically, groundwater use was never a part of these allocation systems.[83] Many states granted all groundwater rights to whoever owned the overlying land, with no duty to share.[84] In Texas, for example, courts have consistently upheld this type of absolute ownership rule.[85] Other states have prorated the amount of a groundwater allotment according to the relative amounts of land owned.[86] Most modern courts, however, attempt to address the needs of later pump-

77. *See id.* at 149-50; WELLS A. HUTCHINS, WATER RIGHTS LAWS IN THE NINETEEN WESTERN STATES 159-75 (1971), *reprinted in* TARLOCK ET AL., *supra* note 7, at 151.

78. TARLOCK ET AL., *supra* note 7, at 149.

79. *Id.* at 177-78, 195.

80. *Id.* at 195-96. *See also* Empire Water & Power Co. v. Cascade Town Co., 205 F. 123, 129 (8th Cir. 1913).

81. TARLOCK ET AL., *supra* note 7, at 3. Colorado is the sole western state that does not govern water rights through a permit system. *Id.* at 3, 243.

82. *Id.* at 229. *See also* David H. Getches, *Water Planning: Untapped Opportunity for the Western States*, 19 J. ENERGY L. & POL'Y 1 (1988), *reprinted in* TARLOCK ET AL., *supra* note 7, at 272-75; Tripp & Jaffe, *supra* note 29, at 9 ("Relationship Between Depletion and Pollution"). Only California has combined the governance of both issues in one administrative body, the State Water Resources Control Board. DAVID H. GETCHES ET AL., CONTROLLING WATER USE: THE UNFINISHED BUSINESS OF WATER QUALITY PROTECTION 91-120 (1991), *reprinted in* TARLOCK ET AL., *supra* note 7, at 227, 229.

83. TARLOCK ET AL., *supra* note 7, at 478-79.

84. *Id.* at 494.

85. *Id.* at 501. *See also* Barber, *supra* note 41, at 678-79.

86. TARLOCK ET AL., *supra* note 7, at 494-95.

ers (those who utilize groundwater), and of the general public, in apportioning water rights.[87] Pumpers have also been required to share in times of shortage, to put the water to a reasonable use, and not to harm other users.[88] In addition, many states, recognizing the possibility of groundwater depletion, have started to integrate groundwater into their water allocation statutes.[89] Arizona, for example, has passed "sweeping new laws designed to protect depleting aquifers."[90] State agencies have regulated pumping rates and have imposed "safe-yield" requirements.[91]

As with surface water, the regulation of groundwater pollution exists entirely apart from groundwater allocation.[92] Some states have passed comprehensive groundwater quality statutes that provide for the regulation of a wide variety of discharge sources, and include provisions for groundwater monitoring and for aquifer mapping and classification.[93] These statutes are enforced through pollutant standards, discharge permits, and land use management plans.[94] More states, however, legislate groundwater according to specific groundwater contamination problems, such as pesticides and leaking underground storage tanks.[95]

Since each state applies water and groundwater law independently from any other state, the coordination of those

87. *Id.* at 515.

88. *Id.* at 52-53, 515.

89. *Id.* at 515.

90. TARLOCK ET AL., *supra* note 7, at 516. Groundwater depletion can also cause saltwater intrusion and/or the collapse of the underlying aquifer, causing land damage and the permanent reduction of the water source. *See id.* at 515.

91. *Id.* at 515. A "safe yield" is the amount of water that can be taken out of the aquifer that will still ensure reliable supplies of water for the future. *Id.* The amount set will depend on the annual rate of recharge of the aquifer in question. *Id.* The yield for aquifers that do not recharge is set according to the length of time the state water board or legislature determines the source should last. TARLOCK ET AL., *supra note 7*, at 515. *See also* Mathers v. Texaco, Inc., 421 P.2d 771 (N.M. 1966) (mandating the use of a fixed rate of withdrawal to determine the economic life of a water basin).

92. *Id.*, *supra* note 7, at 516.

93. MORANDI, *supra* note 43, at 14.

94. *Id.*

95. *Id.* at 13-14. For a table comparing the groundwater legislation of every state, see *id.* at 16-17.

laws can be complicated. The water law of the four border states (Texas, New Mexico, Arizona, and California, from east to west) constitutes nothing less than a Gordian knot of regulation, and no state-wide unified plan to address the water of the border region has yet been created. The water laws of these four states are addressed separately below.

a. Texas

Texas, which shares aquifers with both Mexico and New Mexico in the upper and lower Rio Grande Valleys,[96] has the least regulatory protection of groundwater of the four border states.[97] While some legislation allows the Texas Water Commission to enact groundwater regulations,[98] the only such regulation passed was a management plan for the Edwards Aquifer.[99] Surface water regulation in Texas has evolved from Hispanic law, to the riparian system, to the system of prior appropriation, and is now governed by a water rights adjudication system.[100] Groundwater rights, however, are rights of absolute ownership.[101] A right of absolute ownership is intrinsically linked to the land; whoever owns the land owns the water beneath the land.[102] Consequently, absolute ownership engenders unchecked competition between users and provides no restrictions on uses that adversely affect nearby landowners.[103] One author described Texas groundwater ideology as: "[w]here there is competition for di-

96. *See* Barbara G. Burman & Thomas G. Cornish, *Needed: A Ground-Water Treaty Between The United States and Mexico*, 15 NAT. RESOURCES J. 385, 391 (1975); Barber, *supra* note 41, at 680.

97. *See* Barber, *supra* note 41, at 676-80; 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, 503 (1975).

98. TEX. WATER CODE ANN. § 28.011 (West 1988).

99. Barber, *supra* note 41, at 676-77.

100. AMERICAN WATER WORKS ASSOCIATION, WATER RIGHTS OF THE FIFTY STATES AND TERRITORIES 65 (Kenneth R. Wright ed., 1990).

101. *Id.*

102. Barber, *supra* note 41, at 678-79.

103. *Id.* at 677, 679. *See also* Friendswood Dev. v. Smith-S.W. Indus., Inc., 576 S.W.2d 21 (Tex. 1978). Negligent pumping which causes a neighbor's land to collapse is actionable, however. *Id.* Malicious pumping, designed specifically to injure another landowner is also actionable. TARLOCK ET AL., *supra* note 7, at 494; Barber, *supra* note 41, at 679.

minishing groundwater reserves, 'the biggest pump wins.'"[104] Moreover, Texas courts refuse to recognize the relationship between surface and groundwater,[105] and the Texas Water Commission may only regulate withdrawals from streams.[106] Until the Texas legislature rectifies these problems, the entire region's aquifers are at risk of depletion and contamination.[107]

b. New Mexico

There are 75,546 square miles of aquifers in New Mexico.[108] Six of New Mexico's underground water basins are shared with Mexico: the San Simon, San Luis, and Hachita basins of Hidalgo County; the Wamel and Mimbres basins of Luna County; and the Rio Grande-Mesilla basin of Dona Ana County.[109] New Mexico is the only state to fully recognize the relationship between surface water and groundwater, and has a relatively progressive regulatory system.[110] Water law in New Mexico, for both surface water and groundwater, developed according to the prior appropriation doctrine principle of "first in time, first in right."[111] The state now requires permits for all surface water use and for the use of declared underground water basins,[112] and the State Engineer may promulgate regulations to limit groundwater mining.[113]

104. WILLIAM GOLDFARB, WATER LAW 43 (2d ed. 1988).

105. Barber, *supra* note 41, at 679 & nn. 217 & 218. This refusal stems from the viewpoint that groundwater is only "percolating" and not actually part of a water course. *Id.* However, a Texas court did uphold the Texas Water Commission's specific declaration that the Edwards Aquifer was an underground river, and thus within the Commission's jurisdiction. TARLOCK ET AL., *supra* note 7, at 491. *See also* Sierra Club v. Lujan, No. MO-91-CA-069, 993 WL 151353 (W.D. Tex. Feb. 1, 1993); Castleberry, *supra* note 97 (arguing for the Texas courts and legislature to consider surface and groundwater a single, unified hydrologic system).

106. TARLOCK ET AL., *supra* note 7, at 490.

107. *See* Tripp & Jaffe, *supra* note 29, at 9 (discussing how overmining of groundwater can cause contamination).

108. Barber, *supra* note 41, at 673.

109. Burman & Cornish, *supra* note 96, at 391.

110. Barber, *supra* note 41, at 675.

111. AMERICAN WATER WORKS ASSOCIATION, *supra* note 100, at 57-58.

112. *Id.* at 58.

113. GOLDFARB, *supra* note 104, at 47.

Moreover, while groundwater rights in New Mexico may be sold or transferred, such sales or transfers must first be approved by the State Engineer.[114] Rights that are not used within four years forfeit back to the state.[115] New Mexico nevertheless allows a pumper to deplete up to two-thirds of his groundwater over a forty year period.[116] Furthermore, New Mexico cannot control the water basins it shares with Mexico or Texas, especially since the latter allows unlimited pumping.[117]

c. Arizona

Arizona, which shares groundwater basins with Mexico in the Yuma, Pina, Santa Cruz, and Cochise Counties,[118] has one of the country's most comprehensive and complex water laws.[119] While surface water is governed according to court adjudicated appropriation,[120] groundwater is governed by the 1980 Groundwater Management Act (GMA).[121] The legislature adopted the GMA in response to severe overmining and depletion of groundwater resources caused by the state's dependence on irrigation-heavy agriculture.[122] The GMA created four Active Management Areas (AMAs), each of which covers a basin or sub-basin, in which new uses of water were severely restricted.[123] The GMA also created a Department of Water Resources to implement its provisions.[124] In each

114. Barber, *supra* note 41, at 673.

115. AMERICAN WATER WORKS ASSOCIATION, *supra* note 100, at 58.

116. GOLDFARB, *supra* note 104, at 47.

117. *See supra* section III.A.2.a.

118. Burman & Cornish, *supra* note 96, at 390.

119. GOLDFARB, *supra* note 104, at 46.

120. AMERICAN WATER WORKS ASSOCIATION, *supra* note 100, at 38.

121. GOLDFARB, *supra* note 104, at 46. *See also* ARIZ. REV. STAT. ANN. § 45-411 (1980 & Supp. 1987).

122. TARLOCK ET AL., *supra* note 7, at 545-47. *See also* Barber, *supra* note 41, at 670-71.

123. TARLOCK ET AL., *supra* note 7, at 547. The four AMAs created were Phoenix, Tucson, Prescott, and Pinal, corresponding to 80 percent of Arizona's population, and 69 percent of the state's water use. *Id.* The GMA also created another type of restricted use area called the Irrigation Non-Expansion Area (INEA). *Id.*

124. *Id.*

AMA, the GMA seeks to achieve "safe yield"[125] by the year 2025, by mandating the adoption of plans which would incorporate use reductions, pump taxes, retirement of irrigated lands, and conditions on new uses.[126] However, the GMA protects existing uses in AMAs by making such uses vested rights, although transfers and conversions of such rights must meet specific requirements.[127] Outside of the AMAs, by contrast, groundwater extraction is controlled only by the doctrine of "reasonable use." This doctrine allows pumpers to divert as much water as they want from their own land, as long as they use the water on the overlying land and do not waste it.[128] This strange hybrid of tight and loose control over groundwater sources in Arizona, along with the state's separate regulatory treatment of surface and groundwater, undermines the effectiveness of the GMA.[129]

d. California

California shares groundwater with Mexico in two main regions: around the Tijuana River in San Diego County, and around the Colorado River in the Imperial Valley.[130] California water law developed according to the tenets of prior appropriation, riparian rights, and, in places where an American city grew up over an existing Spanish or Mexican pueblo, pueblo water rights.[131] The prior appropriation system is regulated under the California Water Code according to a permit system administered by the State Water Re-

125. *See supra* text accompanying note 91.

126. DAVID H. GETCHES, WATER LAW IN A NUTSHELL 269-70 (2d ed. 1990).

127. TARLOCK ET AL., *supra* note 7, at 548-53.

128. GOLDFARB, *supra* note 104, at 43-44. *See also* Bristor v. Cheatham, 255 P.2d 173, 178 (Ariz. 1953).

129. *See* Robert J. Glennon, *"Because That's Where the Water Is": Retiring Current Water Uses to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act*, 33 ARIZ. L. REV. 89, 105 (1991); Barber, *supra* note 41, at 672-73.

130. Burman & Cornish, *supra* note 96, at 389.

131. TARLOCK ET AL., *supra* note 7, at 241-42. *See also* AMERICAN WATER WORKS ASSOCIATION, *supra* note 100, at 39-40.

sources Control Board (SWRCB).[132] However, in regions of ancient riparian and pueblo rights, and in areas governed by prior appropriation since 1914, this permit system does not apply.[133] In dealing with this complex hybrid of doctrines, the SWRCB gives priority to the earliest applicable doctrine (usually the riparian doctrine),[134] but automatically applies the permit requirement to all appropriated water rights obtained after 1914.[135] For certain designated watersheds and subterranean streams, but not for non-flowing aquifers, conflicts in water rights are settled by an adjudicated decree.[136]

Despite this comprehensive, if complex, system of surface water regulation, California has yet to pass a similarly thorough permit-based, state-wide groundwater law.[137] As such, no permit is needed for groundwater use, unless such groundwater exists in subterranean streams.[138] Instead, groundwater rights are determined according to a form of correlative rights similar to the riparian system for water used on the overlying land,[139] and according to prior appropriation principles if the water is to be used elsewhere.[140] This quilt of doctrines does little to protect the groundwater resources on which the state relies so heavily for irrigation.[141] Instead, certain municipalities, especially in northern California, have passed local legislation restricting pumping and/or imposing

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132. TARLOCK ET AL., *supra* note 7, at 241. Also, the state constitution requires that "all water rights not exceed an amount of water reasonably required for the purposes of the adjacent lands." *Id.*, *citing* CAL. CONST. art. X, § 2.

133. *Id.* at 242.

134. GOLDFARB, *supra* note 104, at 33.

135. TARLOCK ET AL., *supra* note 7, at 242.

136. *Id.* However, the California legislature allowed such an adjudicated decree in 1971 for the aquifer connected to the Scott River after withdrawal of groundwater caused decreased surface water flow. *Id.*

137. Barber, *supra* note 41, at 667; AMERICAN WATER WORKS ASSOCIATION, *supra* note 100, at 39-40.

138. AMERICAN WATER WORKS ASSOCIATION, *supra* note 100, at 40; TARLOCK ET AL., *supra* note 7, at 241.

139. TARLOCK ET AL., *supra* note 7, at 558.

140. Barber, *supra* note 41, at 669. In such cases, overlying users have priority over transporters. GOLDFARB, *supra* note 104, at 45.

141. Barber, *supra* note 41, at 667. Municipal suppliers and industry also use California aquifers. TARLOCK ET AL., *supra* note 7, at 557.

pump taxes.[142] Finally, some California courts have held that groundwater mining is limited by the "safe yield" amount[143] for the basin in question.[144] Nevertheless, along the Mexico border, aquifers have been subject to salt intrusion, land collapse, and contamination.[145]

B. Mexican Water Law

Mexican groundwater law, like American groundwater law, currently regulates the aquifers that feed the Colorado, Tijuana, Santa Cruz, San Pedro, and New Rivers, and the Rio Grande.[146] Mexican groundwater law arises out of Article 27 of the Mexican Constitution, which vests all subsoil and mineral rights in the national government.[147] In 1934, pursuant to Article 27, Mexico passed the National Water Act, which specifies priorities for water utilization.[148] Then, in 1947, the Mexican legislature passed the Health and Engineering Act of 1947, granting the Mexican government complete control of the nation's water delivery systems.[149] Nine years later, the Mexican legislature passed the Law of Groundwaters,

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142. Barber, *supra* note 41, at 667-68.

143. *See supra* text accompanying note 91.

144. *See* Pasadena v. Alhambra, 207 P.2d 17, 28 (Cal. 1949). However, the court has since noted that "safe yield" does not apply when municipalities are involved. GOLDFARB, *supra* note 104, at 45.

145. Barber, *supra* note 41, at 670; TARLOCK ET AL., *supra* note 7, at 564-65. Such problems exist at the border even though the SWRCB has the authority to restrict pumping or create structural solutions, or both, to prevent "irreparable injury" to groundwater quality. CAL. WATER CODE §§ 2100-2102 (West 1993). Commonly recognized methods of controlling salt water intrusion are:

(1) reduction of pumping or rearrangement of pumping patterns;
(2) recharge of the basin (ordinarily with imported water) to raise the groundwater level above sea level;
(3) creation of a coastal fresh water ridge through injection wells and spreading basins;
(4) construction of an artificial subsurface physical barrier;
(5) creation of a pumping trough along the coast.

TARLOCK ET AL., *supra* note 7, at 564-65.

146. *See* KISS & SHELTON, *supra* note 22, at 223.

147. 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. *See* CONST. art. 27, para. 1 (Mex.).

148. *See* Mumme, *supra* note 147, at 518.

149. *See id.*

which established a permitting system to regulate the development of groundwaters.[150]

The first major environmental statute of Mexico, the Federal Law for the Prevention and Control of Environmental Pollution, was passed in 1971.[151] One year later, the Federal Law of Environmental Protection was passed, the third chapter of which was devoted to water pollution.[152] These two laws emphasized fines for environmental damage without considering the cause and possible prevention of such damage.[153]

Modern Mexican water law was established in 1988 by the General Law on Ecological Equilibrium and Environmental Protection (GLEEEP), which superseded previous environmental laws in Mexico.[154] Prior to the passage of GLEEEP, environmental laws emphasized financial compensation for damage already done.[155] GLEEEP, by contrast, focused on the prevention and enforcement of environmental regulations.[156] GLEEEP operates as a comprehensive environmental statute, taking precedence over all other previous statutes.[157] Most recently, in 1992, the Mexican National Water Law, in combination with GLEEEP, set forth "the legal framework for water pollution control in Mexico."[158] Through GLEEEP, the Mexican government urged decentralization of environmental laws, with the states taking increased responsibility.[159] By 1992, twenty-nine of the thirty-

150. *Id.* This permitting system is similar to that of the Clean Water Act. *See* CWA § 402, 33 U.S.C. § 1342.

151. Federal Law for the Prevention and Control of Environmental Pollution, D.O. (1971).

152. Federal law of Environmental Protection, D.O. (1972).

153. BNA Reporter: 247:0101, § 113 at 171 (1992).

154. General Law of Ecological Equilibrium and Environmental Protection, D.O. (1988) (providing for the protection of natural resources, as well as the prevention of pollution).

155. *Id.*

156. *Id.*

157. *Id.*

158. OFFICE OF GENERAL COUNSEL, EPA, EVALUATION OF MEXICO'S ENVIRONMENTAL LAWS, REGULATIONS AND STANDARDS (PRELIMINARY VERSION OF FINAL REPORT) 7 (1993) [hereinafter EVALUATION].

159. BNA Reporter: 247:0101, § 113 at 171 (1992).

one Mexican states had enacted environmental regulations equivalent to, or tougher than, the federal law.[160]

Before 1992, the Mexican federal agency *Secretaria de Desarrollo Urbano y Ecologia* (Ministry of Urban Development and Ecology) (SEDUE), was responsible for overseeing and implementing both state and federal surface water law in Mexico.[161] SEDUE, in active association with the EPA, established the Integrated Environmental Border Plan (IEBP).[162] In 1992, however, SEDESOL took over the environmental functions of SEDUE.[163] Before the adoption of the IEBP, when the Secretary of Agriculture and Water Resources directed groundwater regulation,[164] no comprehensive permitting system or enforcement measures to thwart groundwater pollution existed. Now, however, the IEBP, GLEEEP, and the National Water Law contain provisions which specifically address groundwater pollution.

Articles 120 through 125 of GLEEEP cover technical discharge standards for "releases from: industry; municipalities; agriculture and livestock activities; mining; the use of pesticides, fertilizers and toxic substances; infiltrations into aquifers; solid waste dumping; and federal facilities."[165] In some cases GLEEEP maintains stricter regulations than the United States by detailing specific standards for landfill siting near groundwater aquifers.[166] GLEEEP specifically requires that hazardous waste, in landfills which are connected

160. EVALUATION, *supra* note 158, at 21. Campeche and Tlaxcala are the two Mexican states that have not adopted environmental laws. *Id.* at 21 n.11.

161. BNA Reporter: 247:0101, § 113 (1992).

162. *Id. See* Justin Ward & Glenn T. Prickett, *Prospects for a Green Trade Agreement - Overview*, 34 ENV'T 44 (1992).

163. BNA Reporter: 247:0101, § 113 (1992).
SEDESOL, a cabinet level agency, was originally created as part of the Mexican Government's economic development reform program, and therefore oversees regional development, urban development, housing, and indigenous peoples, in addition to environmental protection and conservation of natural resources.

Id.

164. *Id.*

165. EVALUATION, *supra* note 158, at 34. The EPA acknowledges that these standards are similar to those of the Clean Water Act. *Id.* at 35.

166. *Id.* at 66.

to groundwater aquifers, be controlled or confined according to more rigid regulations than the EPA requires.[167] "SEDESOL has a mandate to work with the United States on the Integrated Environmental Border Plan to improve environmental laws and the mechanisms to enforce them, and to attempt to privatize infrastructure projects and public services to take advantage of private sector environmental capabilities."[168]

IV. The International Environmental Context

International environmental law is rooted in both customary international law and domestic environmental law. Customary international law is established by individual sovereign nations through state practice (a country's voluntary creation of norms and standards) and through the doctrine of *opinio juris* (the international acceptance of these norms as binding laws).[169] Domestic national environmental law manifests itself principally through federal and state legislation.[170] Historically, nations have addressed the issue of environmental pollution through domestic law.[171] However, because pollution does not abide by politically established territorial boundaries, its effects are of international concern. Furthermore, since domestic law represents the moral and ethical principles of only a single sovereign nation, it cannot adequately address all nations' legal and cultural views of the environment.[172]

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167. *Id.* SEDESOL, the *Comisión Nacional de Aguas* (CNA) (a unit of the Secretariat of Agriculture and Hydraulic Resources (SARH)), and the Secretariat of the Navy promulgate water quality standards. *Id.* at 33, 34.

168. *Id.* at 2-3.

169. *See infra* part IV.A. for an additional discussion of *opinio juris*.

170. *See generally* CWA, 33 U.S.C. §§ 1251-1387; Clean Air Act (CAA), 42 U.S.C. §§ 7401-7671q (1984 & Supp. 1993); and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601-9675 (1980 & Supp. 1987).

171. *See, e.g.*, Trail Smelter Case (U.S. v. Can.) 3 U.N. Rep. Int. Arb. Awards 1911 (Apr. 15, 1935).

172. Louis Henkin, *International Law: Politics, Values, and Functions*, 216 REC. DES COURS 22 (1989), *reprinted in* HENKIN ET AL., INTERNATIONAL LAW: CASES AND MATERIALS 1 (1993) (footnotes omitted).

A. Background in International Environmental Law

Central to international cooperative action lies the concept of *jus cogens*, which has been defined by the 1969 Vienna Convention on the Law of Treaties as "peremptory norms" of general international law.[173] Under Article 53 of the Vienna Convention, a peremptory norm is a conclusive standard which can "be modified only by a subsequent norm of general international law having the same character."[174] A peremptory norm is a norm "from which no derogation is permitted," and which the international community of states has accepted and recognized.[175] This concept was articulated in the oft-quoted *Paquete Habana* case, in which the United States Supreme Court noted, "where there is no treaty, and no controlling executive or legislative act or judicial decision [between disputing states], resort must be had to the customs and usages of civilized nations."[176]

In order for a usage or norm to be considered a customary rule of international law, two tests or doctrines should be followed.[177] The state action doctrine involves the recurrence or repetition of acts;[178] in order for certain conduct to become a customary rule, it must be regular and repeated.[179] Since the practices to which nations adhere are performed voluntarily, state action is often determined by what is politically and economically convenient for the nation at the time of the action. As noted in the acclaimed *North Sea Continental Shelf* case,

> The frequency, or even habitual character of the acts is not in itself enough. There are many international acts, e.g.,

173. *See* HENKIN ET AL., INTERNATIONAL LAW: CASES AND MATERIALS 91 (1993).

174. BARRY E. CARTER & PHILLIP R. TRIMBLE, INTERNATIONAL LAW 130 (2d ed. 1995).

175. *Id.* In cases where a new peremptory norm emerges, an existing treaty will become void if it is in conflict with that norm. *Id.*

176. The Paquete Habana, 175 U.S. 677, 700 (1900) (establishing the principle of application of international law when no national law addresses the issue).

177. CARTER & TRIMBLE, *supra* note 174, at 143.

178. *Id.*

179. *Id.*

> in the field of ceremon[y] and protocol, which are performed almost invariably, but which are motivated only by considerations of courtesy, convenience or tradition, and not by any sense of legal duty.[180]

Thus, conduct is not considered law until the nation expresses a commitment to that practice. A "[s]tate practice consists of the duration, consistency, repetition and generality of the particular custom."[181] Evidence of any state practice is often confirmed through treaties, diplomatic correspondence, United Nations resolutions, and statements of diplomats.[182] Without the subjective and manifest intent of the nation to follow such law, however, even annually-repeated state practices enumerated through international correspondence do not become law.[183]

The second doctrine is that of *opinio juris*, in which "[r]ecurrence of the usage or practice tends to develop an expectation that, in similar situations, the same conduct or the abstention therefrom will be repeated."[184] *Opinio juris* is the subjective element of state action; it expresses the desire of state actors to legally conform to specific international conduct.[185] The critical element of this concept is that, once a state expresses *opinio juris* and performs consistently, its conduct becomes binding as a matter of international law.[186]

International law addressed environmental issues as early as 1935 in the famous *Trail Smelter* case.[187] In that

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180. North Sea Continental Shelf (F.R.G. v. Den./Neth.), 1969 I.C.J. 44 (Judgment of Feb. 20).

181. Suzanne M. Bernard, *Environmental Warfare: Iraq's Use of the Oil Weapon During the Gulf Conflict*, 6 N.Y. INT'L L. REV. 106, 112 (N.Y. St. B.A. 1993).

182. *Id.*

183. *Id.*

184. CARTER & TRIMBLE, *supra* note 174, at 144. When a state conforms to an usage merely as an element of courtesy, there is an absence of *opinio juris*. *Id.*

185. *Developments in the Law-International Environmental Law*, 104 HARV. L. REV. 1484, 1504 n.73 (1991). *See also* C. ROUSSEAU, DROIT INTERNATIONAL PUBLIC 78 (11th ed. 1987).

186. HENKIN ET AL., *supra* note 172, at 82.

187. Trail Smelter Case, *supra* note 171 (holding that, where no applicable international law exists, application of American domestic law is appropriate to

case, a special international tribunal set the precedent of supplementing international environmental law with individual states' environmental statutes.[188] In 1947, the International Court of Justice (ICJ) continued to expand the scope of international environmental law in the celebrated *Corfu Channel* case,[189] which has been heralded as establishing the doctrine of state responsibility under international environmental law.[190] In that case, the ICJ established the principle that nations that are responsible for "imminent dangers" to the environment bear a duty to inform other nations of such dangers.[191] The ICJ drew its authority from the "elementary considerations of humanity . . . and . . . the obligation, resting on every state, not to knowingly allow its territory to be used for acts contrary to the rights of other states."[192]

By requiring states to refrain from using their territory in an injurious manner towards others, the ICJ effectively injected the maxim *sic utere tuo ut alienum non laedas*[193] into the body of international law.[194] With the acceptance of extended state territorial responsibility, the international community attained the necessary authority to express environmental concerns in conventions and declarations.[195]

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address the damaging effects of transboundary air pollution within American borders from pollution stemming from a Canadian-owned corporation).

188. *Id.*

189. Corfu Channel Case, *supra* note 53.

190. *Developments in the Law*, *supra* note 185, at 1497 n.31. *See also* JAMES BARROS & DOUGLAS M. JOHNSTON, THE INTERNATIONAL LAW OF POLLUTION 75 (1974) (Although the danger to the environment was located within territorial boundaries, if the danger had fallen outside these limits, the state's responsibility would have been recognized).

191. GERHARD VON GLAHN, LAW AMONG NATIONS: AN INTRODUCTION TO PUBLIC INTERNATIONAL LAW 337, 339 (5th ed. 1986).

192. *Id.*

193. "[O]ne should use his own property in such a manner as not to injure that of another." BLACK'S LAW DICTIONARY 1380 (6th ed. 1990).

194. Khakee, *supra* note 21, at 852. The application of this concept is vital to international environmental principles and to the notion of state responsibility for transboundary pollution. *Id.*

195. *But see id.* (expressing the paralysis of the *sic utere* principle in relation to international environmental violations); *Developments in the Law*, *supra* note 185, at 1508 n.96 (calling the *sic utere* principle "mere verbiage"). Some authors also note that to avoid pollution of international waterways, the economic cost of preventing the harm should be balanced against the economic loss

Since the *Trail Smelter* and *Corfu Channel* cases, the international community has made general environmental declarations as expressions of customary international law.[196] By 1972, the United Nations General Assembly had created a foundation for international cooperation concerning the environment by passing the Declaration of the United Nations Conference on the Human Environment,[197] better known as the Stockholm Declaration. A decade later, the General Assembly reaffirmed international commitment to the environment in the World Charter for Nature,[198] with 111 nations voting to adopt the Charter.[199] The Charter reaffirms international respect for nature in times of both peace and war.[200] Most recently, the international community expressed concern for the environment through the 1992 Rio Declaration on Environment and Development.[201] The Declaration reiterates Principle 21 of the Stockholm Declaration, calling for state "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States . . . ."[202] Further, the Declaration calls for

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that would result from stopping the harm. *See* McCaffrey, *supra* note 10, at 231.

196. *See, e.g., Declaration of the United Nations Conference on the Human Environment*, U.N. GAOR, U.N. Doc. A/C.48/14 (Stockholm, 1972) [hereinafter *Stockholm*], *reprinted in* LOUIS HENKIN ET AL., BASIC DOCUMENTS SUPPLEMENT TO INTERNATIONAL LAW: CASES AND MATERIALS 698-703 (1993) [hereinafter HENKIN, SUPP.]; *World Charter for Nature*, G.A. Res. 37/7, U.N. GAOR, Supp. No. 51, at 21, U.N. Doc. A/37/L.4/Add.1 (1982), *reprinted in* HENKIN, SUPP., *supra*, at 703-10 [hereinafter *Nature*]; *Rio Declaration on the Environment and Development*, U.N. GAOR, U.N. Doc. A/C.151/5/Rev. 1 (1992), *reprinted in* HENKIN, SUPP., *supra*, at 710-17. [hereinafter *Rio*].

197. *Stockholm*, *supra* note 196.

198. *Nature*, *supra* note 196.

199. The United States cast the only vote against the Charter, and eighteen states abstained. Bernard, *supra* note 181, at 111.

200. *Nature*, *supra* note 196, para. 12-16.

201. *Rio*, *supra* note 196.

202. *Rio*, *supra* note 196, at Principle 2; *Stockholm*, *supra* note 196.

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign rights to exploit their natural resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Stockholm, *supra* note 196, at Principle 21.

states to enact effective national environmental legislation.[203] Consequently, the Rio Declaration reaffirms the customary dependency of international environmental law upon domestic environmental regulation.[204]

B. International Agreements Addressing Groundwater

Scant material exists applying general international declarations of environmental protection to groundwater.[205] Even documents which contemplate the regulation of groundwater, such as the Helsinki Rules on the Uses of the Waters of International Rivers[206] and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes,[207] fail to do so specifically or exclusively.[208] However, certain bilateral treaties have called for groundwater pollution control to fall under the jurisdiction of bilateral commissions and institutions. These treaties are generally found in eastern Europe: the 1955 Yugoslavia-Hungary Agreement; the 1956 Yugoslavia-Albania Agreement; the 1958 Yugoslavia-Bulgaria Agreement; the 1965 Poland-Czechoslovakia Agreement; and the 1964 Poland-USSR Agreement.[209] The 1972 Agreement between Finland and

203. *Rio*, *supra* note 196, at Principles 11, 13.

204. *See id.*

205. KISS & SHELTON, *supra* note 22, at 202 n.176.

206. *Helsinki Rules on the Uses of the Waters of International Rivers, Report of the 52nd Conference* (Helsinki, 1966), *reprinted in* HENKIN, SUPP., *supra* note 196, at 662. Article I of the document explains that "[t]he general rules of international law as set forth in these chapters are applicable to the use of the waters of an international drainage basin . . . ." *Id.* art. I. Article II then defines international drainage basin as "a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and *underground* waters, flowing into a common terminus." *Id.* art. II (emphasis added).

207. *Convention on the Protection and Use of Transboundary Watercourses and International Lakes* (1992), *reprinted in* HENKIN, SUPP., *supra* note 196, at 668. This Convention discusses the regulation of "transboundary waters," which is defined in Article I as "any surface or *ground* waters." *Id.* art. I (emphasis added).

208. In this way, international law resembles the state of U.S. federal law, which also lacks a statute exclusively addressing groundwater. *See supra* discussion at Part III.A.1.

209. Ludwik A. Teclaff & Eileen Teclaff, *Transboundary Ground Water Pollution: Survey and Trends in Treaty Law*, 19 NAT. RESOURCES J. 629, 642-43

Sweden and the 1972 Swiss-Italian convention also address the protection of boundary waters.[210] Although all of these agreements mention groundwater, the majority refers to "watercourses" without providing a clear explanation of the relationships between groundwater and surface water. Consequently, no international consensus on the treatment of groundwater exists. The expiration of the IEBP and the intense industrial and population growth along the United States - Mexico border both serve to intensify the dangers to groundwater.

V. Bilateral Agreements Between the United States and Mexico

Mexico and the United States share a long and difficult history with respect to water. Connected by an expanse of desert now populated with agricultural and industrial users, both Mexico and the western United States depend greatly on the waters of the Colorado River and the Rio Grande.[211] The two nations have grappled over the Rio Grande since 1880.[212] The most recent binding documents between the two nations are the Water Utilization Treaty of 1944,[213] and the 1983 Border Environmental Cooperation Agreement, signed at La Paz.[214] The former's purpose was to define the rights of the two nations to the waters of the Colorado and Tijuana Rivers, and of the Rio Grande,[215] while the latter was designed to address environmental problems.[216]

(1979). The 1955, 1956, and 1958 agreements were concerned with water economy questions, while the 1965 and 1964 agreements were concerned with frontier waters. *Id.*

210. *Id.* at 643, 644.

211. *See generally* W.A. HUTCHINS, WATER RIGHTS IN THE NINETEEN WESTERN STATES (1971-1977) 159-162, *cited in* Robert F. Snow, *Platte River: Reservation and Quantification of Federal Reserved Water Rights — Firefighting and Administrative Purposes Only!*, 11 PACE ENVTL. L. REV. 411, 414 n.6 (1993).

212. *See* Barber, *supra* note 41, at 680-84.

213. 1944 Treaty, *supra* note 15.

214. La Paz Agreement, *supra* note 15.

215. Barber, *supra* note 41, at 683.

216. *Id.* at 686.

However, the Water Utilization Treaty did not eliminate all conflict. Drainage, salinity, and priority-use problems have developed from excessive American and Mexican dependency on the Colorado and Rio Grande Rivers.[217] In the past, American irrigation increased the salinity of water reaching Mexico from the Colorado River, rendering it virtually unusable.[218] The United States conceded that Mexico's right to water under the Water Utilization Treaty implied *usable* water, but this concession was made only after the application of political pressure.[219] The International Boundary and Water Commission (IBWC), which had jurisdictional authority over the dispute under the Water Utilization Treaty, resolved the salinity dispute.[220] Under international law, decisions of commissions empowered by treaty are binding when ratified by the signatory nations.[221] The IBWC, as the empowered agency, recorded the resolution of the salinity dispute in Minute No. 242,[222] ruling that "any new developments of either surface or groundwater resources" by one nation in the border region must be communicated to the other.[223]

Since decisions of the ICJ are deemed acceptable by the world community as rules of customary international law, the principle of notice established in Minute No. 242 binds both the United States and Mexico.[224] By combining this new duty to inform with the rule of mutual state protection, an

217. The 1944 Treaty was an attempt to try to solve the river disputes. *See* KISS & SHELTON, *supra* note 22, at 224-25.

218. *See* HENKIN ET AL., *supra* note 172, at 1386.

219. *Id.*

220. Barber, *supra* note 41, at 683.

221. *Id. See also* LORD MCNAIR, THE LAW OF TREATIES 493 (1961), *reprinted in* HENKIN ET AL., *supra* note 172, at 463-64 (discussing Pacta Sunt Servanda and Good Faith (Article 26)).

222. Minute No. 242, *supra* note 15. Decisions made by the IBWC which involve the "utilization of the international waters" are known as "Minutes." These Minutes are binding on the disputing nations "unless one of the governments objects within thirty days." KISS & SHELTON, *supra* note 22, at 225.

223. KISS & SHELTON, *supra* note 22, at 225.

224. *See id.* at 225 & n.229.

international environmental principle was established.[225] Thus, if water used by both the United States and Mexico were discovered to have adverse and injurious effects upon either country, the nation causing the harm would have the duty to inform the other.[226]

The Rio Declaration also creates legal duties surrounding transboundary aquifers by incorporating Principle 21, in which nations are obligated "to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States . . . ."[227] Since the United States and Mexico have jurisdiction over all geographic entities within their territories, the shared underground aquifers spanning the border fall under both nations' jurisdictions. Therefore, according to Rio Declaration principles, the United States and Mexico are obligated not to cause damage to each other's territory.

In 1983 another bilateral agreement concerning water issues was formed, drawing its substance from the Water Utilization Treaty. This was the United States-Mexico Agreement for Cooperation on Environmental Programs and Transboundary Problems.[228] Later, in 1992, two more agreements affecting the state of pollution cooperation between the United States and Mexico were formed. These two agreements are the topic of the next two sections.

A. The Integrated Environmental Border Plan

The first and most important of these agreements was the Integrated Environmental Border Plan (IEBP).[229] The IEBP sprang from a joint commitment to clean up border pollution on the part of the United States and Mexico.[230] The

225. *See* Trail Smelter Case, *supra* note 171 (stating the principle of duty to inform); Corfu Channel Case, *supra* note 53 (stating the principle of mutual state protection).

226. HENKIN ET AL., *supra* note 172, at 1383 (discussing the Chernobyl Nuclear Plant explosion, and noting that the Soviet Union failed to disclose adverse effects of the accident until long afterwards).

227. *Rio*, *supra* note 196.

228. La Paz Agreement, *supra* note 15.

229. IEBP, *supra* note 15.

230. *Id.* at I-1.

IEBP was signed into effect in February 1992,[231] and expired on December 31, 1994.[232] The IEBP created four common goals to combat pollution at the border area.[233] To accomplish these goals, a Cooperative Enforcement Strategy Group was created from representatives of both SEDESOL and the EPA.[234] At the start of the plan, about $1 billion was pledged,[235] with United States sources donating $379 million, Mexico granting $466 million, and private industries from both countries absorbing the remaining costs.[236] These funds were to be targeted at specific problem areas, including sewage and wastewater treatment, solid waste disposal, infrastructural improvements, and pollution controls.[237] Furthermore, the IEBP provided for technical and informational exchanges to aid in the cleanup.[238]

Despite the IEBP's establishment of these common goals, many commentators criticize its effectiveness. First, some commentators believe that the promised financial backing of the IEBP fell short of what was necessary to clean up pollution at the border.[239] Second, the jurisdictional capacity of the administrative agency implementing the IEBP, the Cooperative Enforcement Strategy Group, was extremely limited. Third, the IEBP was not a binding document on either the United States or Mexico.[240] Finally, the IEBP does nothing to reconcile previous environmental obligations between the two nations.[241]

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231. James P. Duffy III, *The Environmental Implications of a North American Free Trade Agreement*, 10 HOFSTRA LAB. L.J. 561 (1993).

232. *See* IEBP, *supra* note 15.

233. EPA SUMMARY, *supra* note 11, at 20.

234. *Id.* at 21.

235. *President Announces Three-Year Program to Clean Up, Prevent Pollution at Mexican Border*, 22 Env't Rep. (BNA) No. 44, 2427 (Feb. 28, 1992) [hereinafter *Three-Year Program*].

236. *Id.*

237. EPA SUMMARY, *supra* note 11, at 32.

238. *Id.* at 21.

239. *Three-Year Program*, *supra* note 235, at 2427 (quoting Justin Ward, a resource specialist with the Natural Resources Defense Council as saying, "I've seen estimates of $5 [billion] to $9 billion for full-blown efforts. I know they can do better.").

240. *See* Khakee, *supra* note 21, at 874 & nn. 195, 196.

241. *Id.*

B. The NAFTA Environmental Side Accord

Another recent essential document related to the border region is the NAFTA Environmental Side Accord.[242] The NAFTA Environmental Side Accord is distinguished from other trade agreement accords because it acknowledges the link between environmental harm and international trade.[243] The NAFTA Environmental Side Accord echoes the theory of the IEBP by expounding joint environmental principles upon which the United States and Mexico can agree.[244] While the IEBP falls short jurisdictionally, the NAFTA Environmental Side Accord remains a binding international document.[245] In the event of a violation of a specific environmental joint regulation, the NAFTA Environmental Side Accord could be used to enforce penalties.[246] Nevertheless, like its counterpart, the Accord fails to establish a specific plan for enforcement or cleanup of the border region.[247] Instead of promulgating trade sanctions for violations of environmental permits, the Accord merely states that environmental rules should be followed.[248]

Since 1994, international responsibility for environmental cleanup of the border region has further deteriorated. The IEBP expired in December 1994, leaving the NAFTA Environmental Side Accord as the only remaining document that addresses the environmental state of the border. Two agencies, the North American Development Bank (NADBANK) and The Border Environmental Cooperation Commission (BECC) have continued to monitor the situation at the border.[249]

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242. *NAFTA Side Accord*, *supra* note 18, at art. 1.

243. *Id.* at art. 2.

244. *Id.*

245. *Id.* at Preamble.

246. *NAFTA Side Accord*, *supra* note 18, at art. 5.

247. *Id.*

248. *Id.*

249. For further discussion on the NADBANK and the BECC, *see supra* text accompanying note 19.

VI. Current Pollution and Enforcement Problems at the Border

A. Current Pollution Problems

The border between the United States and Mexico extends from the Pacific Ocean to the Gulf of Mexico, covering a distance of nearly 2,000 miles.[250] In the past twenty years, the border has experienced a great influx of industrial and agricultural users, coupled with an unprecedented number of immigrants,[251] all of whom need water. According to the 1992 Review of U.S.-Mexico Environmental Issues, the border population grew from 3.3 million in 1980 to almost 4.7 million in 1990.[252] Another source estimates that the population increased to six million between 1980 and 1990.[253] Projections predict a future annual growth rate of three percent, to create a total border population of ten million by 2003.[254] This influx will constitute a further burden on an overwhelmed "environmental infrastructure capacity."[255] Border cities, which "rely principally on groundwater," are in increasing competition for available water.[256] Moreover, sewage disposal systems and waste disposal facilities are inadequate to handle the flood of people and businesses.[257]

Environmental degradation is so severe that the stretch of the Rio Grande running through downtown Nuevo Laredo, Mexico, carries 1,000 times the fecal contamination level allowed by Texas law.[258] Moreover, ninety percent "of adults

250. INTERAGENCY TASK FORCE OFFICE OF THE U.S. TRADE REPRESENTATIVE, REVIEW OF U.S.-MEXICO ENVIRONMENTAL ISSUES, EXECUTIVE SUMMARY 106 (1992) [hereinafter REVIEW].

251. KISS & SHELTON, *supra* note 22, at 223.

252. REVIEW, *supra* note 250, at 106.

253. Khakee, *supra* note 21, at 854.

254. *Report Presents Environmental Challenges Along U.S./Mexico Border: A Greener Frontier*, BUSINESS MEXICO, May 1994, *available in* LEXIS, World Library.

255. *Id.*

256. McCaffrey, *supra* note 26, at 229.

257. Michael S. Feeley & Elizabeth Knier, *Environmental Considerations of the Emerging United States-Mexico Free Trade Agreement*, 2 DUKE J. COMP. & INT'L L. 259, 272 (1992).

258. *Id.* at 273. *See* James Garcia, *Border River Laden With Wastes*, AUSTIN AM.-STATESMAN, Sept. 29, 1991, at A1.

thirty-five years or older in the shanty towns near San Elizario, Mexico, contract Hepatitis sometime during their lifetime,"[259] and the level of Hepatitis found at the border of Arizona is twenty times the American average.[260] Arizona declared a public health emergency in 1992 as a result of untreated wastewater and toxic industrial pollution in the Nogales Wash.[261] Similarly, the New River carries over one hundred industrial chemicals and "every disease known in the western hemisphere" from Mexico into California.[262] According to studies done by the Arizona Department of Environmental Quality, industrial solvents and hazardous organic compounds were found to exist in groundwater.[263] In addition, raw sewage and industrial contaminants also flow from both Texas and Mexico into the Rio Grande.[264] The worst of the pollution in the border region has been caused by the flow of untreated sewage into the rivers because of the lack of treatment facilities in the region.[265] Nevertheless, the pollution remains unchecked, in part because of the United States' decision to leave the problem to the IBWC, and because of "loopholes" in Mexican regulations.[266]

Several types of pollution affecting groundwater have contributed to the aforementioned health problems, including hazardous waste, pesticides, and sewage. Hazardous waste is a particularly troublesome pollution problem for border aquifers, in part because of Mexico's *maquiladora* program.[267]

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259. Feeley & Knier, *supra* note 257, at 273.

260. *Id.* at 273 n.100. *See* Robert Suro, *Border Boom's Dirty Residue Imperils U.S.-Mexico Trade*, N.Y. TIMES, Mar. 31, 1991, at A1.

261. Feeley & Knier, *supra* note 257, at 273.

262. *Id.* at 275, n.114 (quoting Jane Kay, *The "Toxic Dump" that Flows into California*, S.F. EXAMINER, June 22, 1986, at 7).

263. *Transboundary Pollution*, *supra* note 2, at 307.

264. Brenda S. Hustis, *The Environmental Implications of the North American Free Trade Agreement*, 28 TEX. INT'L L.J. 589, 597-600 (1993).

265. *Id.* at 597.

266. *Transboundary Pollution*, *supra* note 2, at 307.

267. "A *maquiladora* is a manufacturing operation that temporarily imports, duty free or under bond, capital goods . . . [and] inputs," and produces finished goods for export. *A Case Study of Internationalization*, BUSINESS MEXICO, January/February 1994, *available in* LEXIS, News Library, Mags File. The *maquiladora* industry developed out of the International Agreement of Migratory Workers of 1942 between the United States and Mexico, the Bracero Program.

Sixty-eight percent of the *maquiladoras* produce electronics, transportation equipment, petroleum-based products, or metals, all of which emit toxic chemicals into the air, water, or land.[268] By 1992 approximately 1,963 *maquiladoras* operated at the border,[269] of which only 307 obtained permits to pollute.[270] Furthermore, while fifty-two percent of the *maquiladoras* generated hazardous waste, only nineteen percent have been documented as either recycling their waste or returning their waste to the country of origin.[271]

Illegal dumping of hazardous waste and misuse of hazardous waste in Mexico, while not well documented, has been called "obvious," and has shown up in groundwater tests.[272]

Id. Under the Bracero Program, Mexican workers, mostly the rural poor, temporarily entered the United States to increase American agriculture production. *Id.* The American government unilaterally terminated the Program in the early 1960's under pressure from American labor. *Id.* In its place, the Mexican government instituted the 1965 Border Industrialization Program to spur job creation and foreign investment. *A Case Study of Internationalization*, BUSINESS MEXICO, January/February 1994, *available in* LEXIS, News Library, Mags File. The *maquiladora* industry blossomed in the 1980's, growing from 539 to 1,834 facilities by early 1990. *Id.* In 1994, 2,155 maquiladoras operated in Mexico, employing 544,500 people. *Id.* The Mexican *maquiladora* program is now one of the world's largest. *Id.*

Maquiladoras may be completely foreign-owned, and employ foreign managers and technicians. *A Case Study of Internationalization*, BUSINESS MEXICO, January/February 1994, *available in* LEXIS, News Library, Mags File. Originally restricted to a 20 kilometer strip following the border, *maquiladoras* now may locate anywhere within Mexico. *Id.* Mexico requires that only 33 percent of the finished products the *maquiladoras* produce be sold in the Mexican market, while the rest must be exported. *Id.* American customs laws also provide favorable tax treatment, taxing only the value of labor and material added in Mexico to American materials or components. *Id.* In 1992, the *maquiladora* industry contributed $4.74 billion in added value to imported American material. *A Case Study of Internationalization*, BUSINESS MEXICO, January/February 1994, *available in* LEXIS, News Library, Mags File.

268. *See* EPA SUMMARY, *supra* note 11, at 8.

269. Malissa H. McKeith, *Analysis and Perspective: Environmental Provisions Affecting Businesses on the U.S./Mexico Border*, 15 Int'l Env't Rep. (BNA), No. 8, 245, 246 (Apr. 22, 1992).

270. *Id.*

271. Hustis, *supra* note 257, at 601, *citing* Mary E. Kelly et al., *U.S.-Mexico Free Trade Negotiations and the Environment, Exploring the Issues*, 26 COLUM. J. WORLD BUS. 42, 52 (1991). Under Mexican law, hazardous waste which cannot be "nationalized or recycled into usable products" must return to the country of origin for disposal. *Id.* at 600 (quoting Kelly, *supra*).

272. *Transboundary Pollution*, *supra* note 2, at 307.

Examples of such improper disposal are startling. In the mid-1980's, scrap metal containing radioactive cobalt-60 from a hospital x-ray machine was sold to a furniture manufacturer instead of being treated and buried.[273] This manufacturer incorporated the metal into tables and chairs which were later distributed in the American home furnishings market.[274] Perhaps most shocking is the 1993 incident in Juarez, Mexico, where a ten-year-old girl suffered chemical burns after stepping into a pool of unidentified, toxic, industrial solvent that had leaked from Presto Lock, an American-owned padlock factory.[275] The incident prompted a groundwater study by the city environmental officer of Juarez, who discovered "incredibly high levels of cyanide and chromium" in the city drainage system.[276] Unfortunately, the Mexican jurisdictional framework precluded city officials from enacting swift sanctions against Presto Lock because only the federal government held the power to sanction polluters.[277] Although the city imposed sanctions on Presto Lock once the pollutants entered the city drainage system,[278] a potable drinking source had already been contaminated.[279] Clearly, such shocking incidents exemplify the critical need to prevent mismanaged dumping of hazardous waste into waterways and underground aquifers.

Pesticides are an additional problematic source of ground water pollution, in part because major agricultural busi-

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273. Todd Robberson, *Mexicans Rage over Pollution; Injury of 10-year-old Draws Out Protestors*, WASH. POST, Dec. 24, 1993, at A10.

274. *Id.* Although most of the furniture has been retrieved, some of it remains unrecovered. *Id.*

275. *Id.*

276. Todd Robberson, *Mexicans Rage over Pollution; Injury of 10-year-old Draws Out Protestors*, WASH. POST, Dec. 24, 1993, at A10. (quoting Francisco Nunez, the Juarez environmental officer). The Juarez study produced results similar to those of a 1985 EPA investigation of Presto Lock's plant in Garfield, New Jersey, which resulted in a $30,000 fine on Presto Lock for illegal dumping of heavy metals and cyanide. *Id.*

277. Robberson, *supra* note 273, at A-10.

278. *Id.* "Because federal law gave the city sole jurisdiction over its drainage system, Juarez could sanction Presto Lock for dumping solvents once they entered city sewers." *Id.*

279. *Id.*

nesses also operate on the border. Mexican pesticide regulations are less stringent than American regulations.[280] In fact, the Mexican government argues that Mexico should not be expected to abide by the rigorous environmental regulations set by the United States because Mexico is unable to afford the same standards.[281] Unfortunately, in the United States, pesticides used in agriculture fall into the category of "non-point source" pollutants,[282] which are not as stringently regulated as point source pollutants such as those emanating from pipes, ditches, and channels.[283] While many states have groundwater quality statutes that specifically regulate the effects of pesticides and other agricultural chemicals on groundwater,[284] these statutes vary in stringency from state to state,[285] and are often ineffective at stemming groundwater contamination from agricultural applications.[286] These same problems exist in Mexico along the border region.[287]

Sewage effluent is a third major pollutant at the border area. This problem is accentuated by the heavy financial burdens on the infrastructure of the borderlands and the lenient Mexican environmental enforcement standards,[288] resulting in inadequate measures to treat raw sewage.[289] For example, the Tijuana River, which flows north to the United States (as

280. Feeley & Knier, *supra* note 257, at 269. Likewise, United States pesticide regulations are less stringent than those of Canada. *Id.* at 270. The United States oversees pesticide use under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. §§ 136-136y (1988), and controls point source pesticide use under the CWA, 33 U.S.C. §§ 1251-1387.

281. Feeley & Knier, *supra* note 257, at 268.

282. SIERRA CLUB LEGAL DEFENSE FUND, THE POISONED WELL 283 (Eric P. Jorgensen ed., 1989).

283. *See* CWA §§ 502(14), 402, 33 U.S.C. §§ 1362(14), 1342; Miller & Long, *supra* note 49, at v. I, ch. III, 62, 63.

284. MORANDI, *supra* note 43, at 34-36.

285. *Id.* at 16-17, 34-36.

286. SIERRA CLUB LEGAL DEFENSE FUND, *supra* note 282, at 278. "EPA has documented groundwater contamination in 23 states by 17 pesticides from normal agricultural use, with an Iowa study showing low pesticide concentrations in 70 to 80 percent of wells sampled." *Id.*

287. Feeley & Knier, *supra* note 257, at 266, 267.

288. *Id.* at 268.

289. *Id.* at 272.

does the underground aquifer which accompanies it), has become a dumping place for raw sewage.[290] At times, sewage and sewage waste from the Tijuana River have been used to irrigate agricultural fields.[291] Like pesticide run-off, this untreated irrigation poses grave risks to groundwater purity.[292]

The Mexican and American governments have made some efforts to address these pollution concerns. In 1992, Mexico allocated $460 million for environmental improvement, and the United States earmarked $379 million, $125 million of which was to be spent creating sewage treatment plants at the border.[293] Moreover, in 1992 the IBWC created the IEBP as an administrative framework through which to accomplish environmental objectives at the border.[294] Concerned about health standards, the joint commission established several goals to address these pollution concerns. These goals included monitoring groundwater and creating an inventory of the sources of, and the treatment processes for, drinking water along the border.[295] The Commission also cited the underground aquifers of the Rio Grande and the Colorado River as suffering adverse effects from increased industrial growth and residential development along the border.[296] However, the IBWC, the administrative agency charged by the IEBP to gather groundwater quality data, missed the deadline for a data report and failed to deliver any conclusions.[297] In addition, the IEBP does not address how enforcement actions should proceed, instead leaving that issue for the individual countries to address.[298]

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290. Hustis, *supra* note 271, at 598.

291. *Id.*

292. *See id.*

293. David C. Scott, *U.S., Mexico Launch Border Cleanup*, CHRISTIAN SCIENCE MONITOR, Feb. 28, 1992, at 6.

294. *See* IEBP, *supra* note 15; Barber, *supra* note 41, at 642.

295. IEBP, *supra* note 15.

296. *Id.*

297. IEBP, *supra* note 15; Barber, *supra* note 41, at 648-49.

298. Barber, *supra* note 41, at 648-50.

B. Current Enforcement Problems

Because several different authorities regulate groundwater at the border, using various laws, enforcement of pollution standards is extremely complex and difficult.[299] Not only do Mexico and the United States address groundwater through federal laws and regulations,[300] but the states of California, Arizona, New Mexico, and Texas in America, and Chihuahua, Baja California Norte, and Tamaulipas in Mexico, also create regulatory measures and enforcement procedures regarding water pollution,[301] as do local city agencies.[302] Moreover, several international commissions have adopted articles mentioning anti-pollution measures for groundwater.[303] Yet all these legal attempts to protect groundwater have been incapable of providing strong enforcement or a procedural mechanism by which to punish and deter polluters.[304]

Discrepancies in legal groundwater regulation create two major enforcement problems. First, under GLEEEP, SEDESOL has the power to order cleanups, close facilities, and confiscate hazardous materials.[305] By 1991, SEDUE had closed over seventy companies which were polluting air and water resources.[306] The Mexican government has also increased the number of environmental patrols along the border areas.[307] Nevertheless, these efforts simply remain insufficient to identify all violators.

Second, although transboundary pollution is an acknowledged international issue, to date there exists no comprehen-

299. *See supra* discussion at Part III.A.

300. *See supra* discussion at Parts III.A. and B.

301. *See supra* discussion at Parts III.A.2. and B.

302. BNA Reporter: 247:0101 § 113 at 171 (1992).

303. *See supra* discussion at Part VI (analyzing the 1944 Treaty between the United States and Mexico, the International Law Commission on Non-Navigational Uses of Watercourses, and the IEBP).

304. Khakee, *supra* note 21, at 865-66, 874-75.

305. McKeith, *supra* note 269, at 246-47.

306. *Id.* at 247.

307. *See* Secretary Warren G. Christopher, *U.S.-Mexican Relations and NAFTA: The Opportunity of a Generation*, Address Before the U.S.-Mexico Binational Commission (June 21, 1993), *in* U.S. DEP'T ST. DISPATCH, June 28, 1993.

sive international transboundary aquifer policy.[308] The current international treaties addressing groundwater pollution fail to provide a clear mechanism for enforcement of penalties or for injunctive relief.[309] Most international treaties revolve around the concept of state action, under which actions of nations are legal unless they violate specific international treaty provisions to which the nations involved have agreed.[310] Currently, the International Legal Commission (ILC) regards water issues under the "no-harm" rule,[311] which has been criticized for not specifying whether a "strict liability" or a "due diligence" standard will apply when analyzing violations of water regulation.[312]

VII. Possible Solutions

In 1989, after over ten years of discussion and revision by several transboundary resource scholars, the IBWC created and proposed the Bellagio Draft Treaty as a possible solution to the pollution problem at the border.[313] The Bellagio Draft Treaty proposed a division of groundwater into zones where groundwater has reached critical levels of depletion or pollution.[314] Pollution violations occurring within these zones would be governed by either American or Mexican national water law, with oversight by an international agency like the IBWC.[315] Any regulations to which the IBWC or any other appropriate joint commission agreed would preempt national water law.[316]

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308. KISS & SHELTON, *supra* note 22, at 225.

309. *See* Teclaff & Teclaff, *supra* note 209.

310. *See supra* discussion at Part IV.A.

311. McCaffrey, *supra* note 26, at 230. The ILC is an international body that the IBWC called upon to draft principles of law for international watercourses. *Id.* at 229. The "no-harm" rule is an obligation set forth by the ILC that a state must not cause appreciable harm to another state through its use of an international watercourse. *Id.* at 230.

312. *Id.* at 231.

313. *Transboundary Groundwaters*, *supra* note 23, at 665-66.

314. *Id.* at 664-65.

315. *Id.*

316. *Id.*

Unfortunately, the terms of the Bellagio Draft Treaty present potential conflicts, since groundwater protection is such a new and unresolved area of law. For example, the question of a liability standard remains unexplored in the treaty.[317] Currently, environmental law under the IBWC conforms to traditional American tort analysis,[318] which may or may not be incorporated into the treaty. Moreover, Mexico and the United States could adhere to either a strict liability standard or a negligence standard if groundwater is polluted.[319] Should the United States and Mexico not agree on a standard of liability, disputes could arise.

The United States and Mexico may well look to the IBWC or the ICJ to resolve any dispute that does arise under the treaty. The court may rely on *jus cogens* in order to resolve the dispute.[320] Alternatively, the ICJ may look to several multilateral declarations which announce a commitment to the preservation and protection of the environment to fashion a remedy for potential pollution conflicts between Mexico and the United States.[321]

The court also has another option. As articulated in the *Paquete Habana* case,[322] when no international precedent is available upon which the court may rely, the court may look to the domestic laws of the disputing states.[323] Although the domestic water laws of both Mexico and the United States are in a continual state of regulatory flux, the court may choose to employ the United States CWA section 310(a)[324] option, thus elevating the concepts of "endangerment finding" and a "reciprocity finding" to the international level.[325] However, since the United States itself has yet to rely on section 310(a) of the CWA, the use of this section would be a great leap for the ICJ. Even if the ICJ did apply the principles of endangerment and

317. *See* McCaffrey, *supra* note 26, at 231.
318. *Developments in the Law*, *supra* note 185, at 1494.
319. McCaffrey, *supra* note 26, at 231.
320. *See supra* discussion at Part IV.A.
321. *See supra* discussion at Part V.
322. The Paquete Habana, 175 U.S. 677 (1899).
323. *Id.*
324. CWA § 310(a), 33 U.S.C § 1320(a).
325. *See* Khakee, *supra* note 21, at 862.

reciprocity findings, both the United States and Mexico may escape future liability for groundwater pollution by simply refusing to attend the proceedings.[326] Consequently, at a minimum, the Bellagio Draft Treaty must be revised to include a specific liability standard and ensure binding responsibility on the states.

VIII. Conclusion

Further commercial and industrial development of the borderlands, and the pollution that comes with it, is inevitable. Moreover, the border population will continue to rely on groundwater as the source of most of its water. Unfortunately, Mexico lacks the infrastructural ability to curtail and enforce pollution abatement measures. In addition, without a treaty, the United States bears no specific obligation to reduce the threat of pollution. With the expiration of the International Environmental Border Plan in 1994, the recent passage of NAFTA, and the incredible industrial and population explosion at the borderlands, a system of bilateral cooperation between Mexico and the United States addressing groundwater protection at the borderlands is essential. The only way to ensure that the threat of groundwater pollution and depletion at the border is properly addressed would be for the United States and Mexico to pass a binding groundwater nation-state agreement.

326. *See* Nuclear Test Case (Austl. v. Fr.), 1973 I.C.J. 99 (Judgment of June 22) (where France escaped liability for transboundary pollution by refusing to submit to ICJ jurisdiction).