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Groundwater Management in Kansas: A Brief History and Assessment

by

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GROUNDWATER MANAGEMENT IN KANSAS: A BRIEF HISTORY AND ASSESSMENT

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I. INTRODUCTION

The purpose of this symposium is to examine groundwater management laws, institutions, and practices and to inquire whether groundwater management is working. The primary focus is groundwater management in Kansas, and we do this with a number of papers prepared by knowledgeable professionals from Kansas and from locations outside Kansas, including groundwater experts from India and Texas, and a scholar of the law of groundwater on American Indian reservations.

My first encounter with groundwater management was in 1979, when I taught my first class in water law at the University of Kansas School of Law. Groundwater Management Districts (GMD's) were then the newest of several types of special water districts in Kansas. I received a KU general research grant to make a legal study of GMD's. I traveled to South-central and Southwest Kansas in the summer of 1980 to see this land and the workings of these districts first hand. After touring the land, including a helicopter ride over the irrigation fields in the Garden City area, listening to the GMD managers, and studying legal issues, I wrote an article on Kansas GMD's for the Kansas Law Review.[1] The five Kansas GMD's had existed for several years at that time. The article was essentially a look at the enabling legislation and its history and provisions; the GMD regulations adopted to that time, with a study of the scientific rationale behind them; and my attempt to predict the emergence and outcome of legal issues that might arise under the GMD Act. Over the intervening years I have traveled to all areas covered by the five GMD's. I have followed developments and since 1990 have described them in the water law chapter of the KBA Annual Survey of the Law publication. My viewpoint might be described as an outsider's view, a view of Western Kansas from Eastern Kansas. Yet it is not entirely an academic view. I have a bit of an insider's look, as I have met and become acquainted with GMD staff and

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1. John C. Peck, *Kansas Groundwater Management Districts*, 29 U. KAN. L. REV. 51 (1980) [hereinafter *Kansas GMD's*].

have represented clients affected by GMD legislation and regulations, generally in transactional matters such as purchases and sales of water rights and in administrative matters such as changes and abandonment of water rights. I also participated passively in the 1990 and 1991 hearings to establish the Walnut Creek Intensive Groundwater Use Control Area to benefit the Cheyenne Bottoms, and in the 2004 hearings to consider the City of Wichita's applications for water rights under its proposed Aquifer Storage and Recovery (ASR) Project on the Little Arkansas River.

The purpose of this paper is to provide background on groundwater management in Kansas and to present my perspective on whether the Kansas experiment in managing groundwater has "worked." First is a brief description of the legal setting in Kansas when groundwater management became a legislative concept. Second is a brief history of the legislation, the creation of the GMD's, and their activities to the time I wrote the 1980 article. Third is a section on GMD and state administrative and legislative activities since the inception of GMD's. Following that listing of activities generally, I detail several of the more important matters in which GMD's have been involved. Finally, I attempt to assess the efficacy of groundwater management in Kansas and make a suggestion for further review and assessment.

II. THE LEGAL SETTING IN 1968, THE ORIGINAL GMD ACT, THE DEVELOPMENT OF GMD'S, AND THEIR EARLY ACTIVITIES

With the enactment of the Water Appropriation Act in 1945,[2] Kansas adopted the prior appropriation doctrine for both surface water and groundwater. Prior to 1945, Kansas was a riparian doctrine[3] state for surface water and an "absolute ownership doctrine"[4] state for groundwater. Landowners were thought to own the water under the surface in the same way they owned the surface. When the legislature passed the Appropriation Act, it took control of the groundwater by declaring that "all water within the state of Kansas is hereby dedicated to the use of the people of the state, subject to the control and regulation of the state . . . ."[5] The chief engineer of DWR was charged with "controlling, conserving, regulating, allotting, and aiding in the distribution of the water resources of the state."[6] The Act allowed persons who had been using water prior to that time to continue their use by claiming

2. 1945 Kan. Sess. Laws ch. 390, § 1, *et seq.*, now found at KAN. STAT. ANN. §§ 82a-701 to - 773 (1997 & Supp. 2005).

3. Riparian landowners hold water rights by virtue of their ownership alone. Rights are not gained by use, nor lost by non-use, and disputes are decided in court.

4. The Absolute Ownership Doctrine is also called the English Doctrine and the "rule of capture."

5. K.S.A. § 82a-702 (Supp. 2005), *questioned in* Williams v. City of Wichita, 374 P.2d 578, 596 (1962) (Schroeder J., dissenting) (claiming the legislation had "communized" the water resource).

6. 1945 Kan. Sess. Laws ch. 390, § 6, now found K.S.A. § 82a-706 (1997 & Supp. 2005).

"vested rights."[7] From June 30, 1945, to obtain a right to divert water, except for "domestic use," a prospective water user had to file an application for a permit and have it approved by the chief engineer of DWR. Prospective water users began to file applications for appropriation rights. Persons using water prior to that date sought and obtained certificates for their vested rights. An important amendment to the Act in 1957 was the addition of a definition of a "water right" (both appropriation and vested) as "a real property right."[8]

By 1968, the number of applications for water rights from DWR was increasing. From only 334 permit applications from 1945 to 1950, the number grew to 5,730 applications applied for in the decade of the 1950s, and to 6,433 applications in the 1960s.[9] Most of these applications were for groundwater irrigation rights from the aquifers of Western Kansas. By the late 1960s, the legislature had become concerned with the groundwater "mining" (depletion) situation and passed legislation in 1968 to enable the creation of groundwater management districts.[10] When this legislation produced no GMD's, the legislature enacted the GMD Act in 1972.[11] The 1972 GMD Act laid out several purposes, discussed below. It conferred powers on the GMD's to establish management plans, recommend regulations to the chief engineer, and create and enforce standards and policies. This latter power gave GMD's a degree of local autonomy separate from DWR. Following the rigid procedures prescribed in the GMD Act, five GMD's were established, their current boundaries shown in Figure 1.

7. *Id.*, § 4, codified at KAN. STAT. ANN. § 82a-704 (repealed in 1979) (setting a July 1,1980 deadline for claiming vested rights established in § 82a-704a).

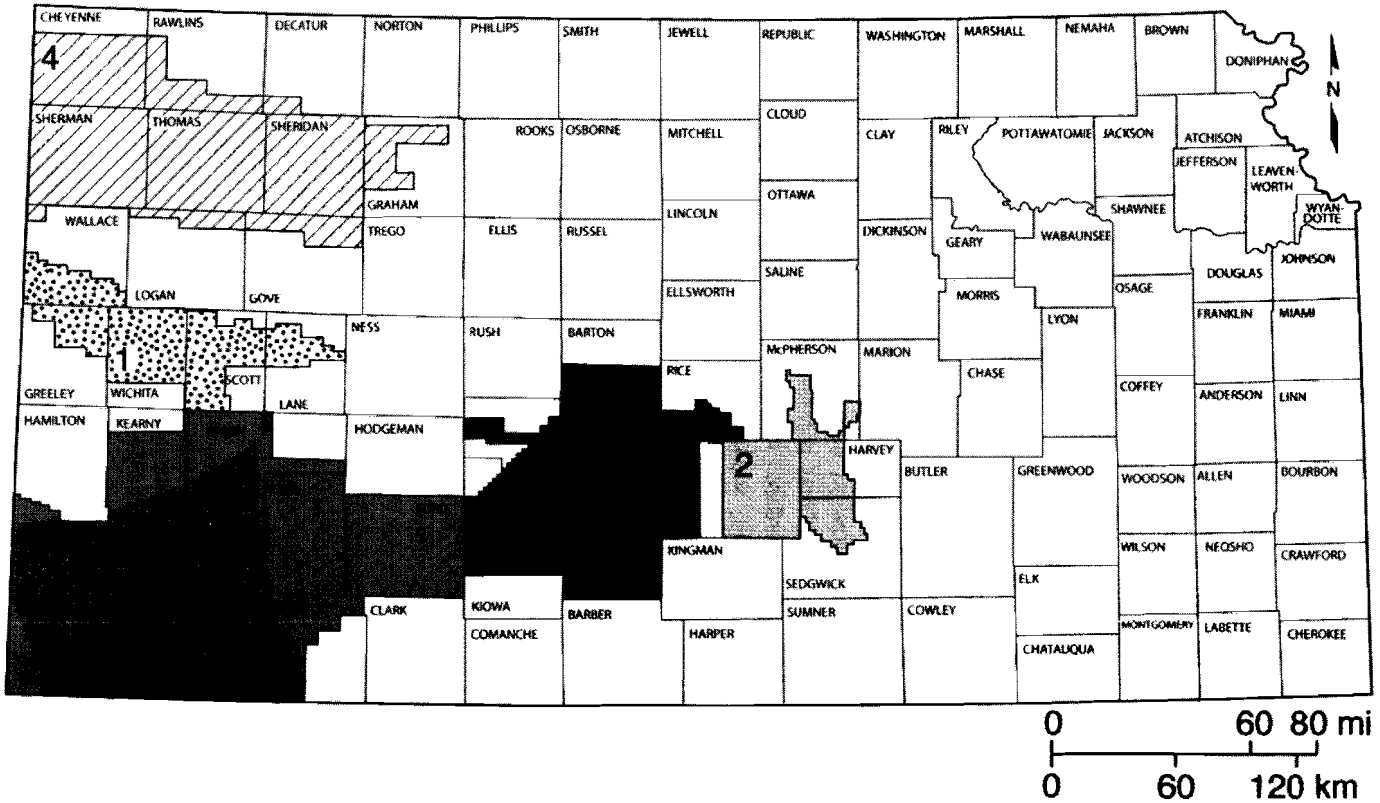
8. 1957 Kan. Sess. Laws ch. 539, § 1, now found at KAN. STAT. ANN. § 82a- 701(g) (Supp. 2005).

9. Fax from James Bagley, Kansas Division of Water Resources, to author (Feb. 8, 2005) (on file with KAN. J. L. & PUB. POL'Y) (applications reached a peak of 16,226 in the 1970's, then dropped to 5,716 in the 1980's, 3,659 in the 1990's, and 2,097 since 2000).

10. 1968 Kan. Sess. Laws ch. 403 (previously codified at KAN. STAT. ANN.§§ 82a-1001 to -1019; repealed 1972). *See Kansas GMD's*, *supra* note 1, at 52 (discussing the codification of the 1968 session laws and their repeal in 1972).

11. 1972 Kan. Sess. Laws ch. 386, §§ 1 through 16, now found at K.S.A. §§ 82a-1020, *et seq.* (1997 & Supp. 2005).

Figure 1: Kansas Groundwater Management Districts



In my 1980 article on GMD's,[12] I suggested a possible constitutional infirmity in the GMD Act based on the legislature's constitutional power to confer powers of local legislation upon political subdivisions,[13] but no such challenges have been made on that basis. Another possible problem lay with the 1978 amendment that permitted the chief engineer to establish "intensive groundwater use control areas" (IGUCA's). That amendment permitted the chief engineer to take extraordinary measures for IGUCA's such as reducing annual quantities of existing water rights. That power might be construed as an unconstitutional "taking" of property, for which compensation should be due. The reason is that holders of water rights, defined in the Water Appropriation Act as real property rights,[14] might claim that any forced pump reductions based on anything other than seniority would amount to a taking.[15] Unlike California,[16] Kansas has not adopted the public trust doctrine in this context.[17] One of the parties in a 1991 IGUCA case, discussed in more detail below, filed an appeal on that basis, but the appeal became moot when the parties settled the case.[18] In the article, I also discussed the possibility of GMD's suing or being sued, and since 1980, several GMD's have been parties in lawsuits, administrative matters, and hearings.

The GMD Act states the twin, and perhaps inconsistent, policies of "establish[ing] the right of local water users to determine their destiny with respect to the use of the groundwater" on the one hand and of "preserv[ing] basic water use doctrine" on the other.[19] These policies seem to pit the Water Appropriation Act and Chief Engineer, the Appropriation Act's administrator, against the GMD's. When first enacted, the GMD Act seemed to permit GMD's some local autonomy. While GMD's could only recommend regulations to the chief engineer, who would adopt them as DWR regulations, GMD's could on the other hand "adopt and enforce" "standards and policies" on their own.[20] The legislature, however, took this latter power away in 2002.[21] How the chief engineer and the GMD's have related to each other,

12. *Kansas GMD's*, *supra* note 1.

13. *See Id.*, at 54-56 (discussing a potential constitutional challenge based on the Kansas Constitution, art. 2, § 21, and suggesting that the region-wide or statewide problem of depleting groundwater may not be local).

14. KAN. STAT. ANN. § 82a-701(g) (Supp. 2005); *see also* text accompanying note 8 *supra*.

15. *See* John C. Peck, *Property Rights in Groundwater: Some Lessons from the Kansas Experience*, 12 KAN. J. L. & PUB. POL'Y, 493, 499-505 (2003) [hereinafter *Property Rights*]; John C. Peck & D. Nagel, *Legal Aspects of Kansas Water Resources Planning*, 37 U. KAN. L. REV. 199, 238-80 (1989) [hereinafter *Legal Aspects*].

16. Nat. Audubon Soc. v. Sup. Ct., 658 P.2d 709 (Cal. 1983).

17. Kansas *ex rel.* Meek v. Hays, 785 P.2d 1356 (Kan. 1990); *see also Property Rights, supra* note 15, at 502-504..

18. *See* discussion *infra* in sec. III.B.1.

19. KAN. STAT. ANN. § 82a-1020 (1997).

20. 1972 Kan. Sess. Laws ch. 386, § 9 (n).

21. 2002 Kan. Sess. Laws 137, §5; KAN. STAT. ANN. § 82a-1028(n) (2005 Supp.) now simply states that a GMD may "adopt administrative standards and policies," not "adopt, amend, promulgate, and enforce" standards and policies, as it had done previously.

how they have resolved conflicts, and how they have worked within their own spheres of responsibility and jurisdiction to effectuate the express purposes of the GMD Act are questions more fully addressed by personnel from DWR and the GMD's at this symposium.

The final subject of the 1980 law review article dealt with the regulations existing at that time, in particular those involving safe yield[22] for the eastern two GMD's (Big Bend GMD No. 3 and Equus Beds GMD No. 2) and depletion regulations for Southwest Kansas GMD No. 3. Safe yield formulae attempt to prevent mining of the aquifer, while depletion formulae attempt to control the rate at which mining occurs. The article described those regulations, which contain mathematical formulae to be applied to applications for new permits for groundwater. It cited Colorado cases construing and upholding similar formulae.[23] One difference between the Colorado and Kansas regulations was with circle size: Colorado used a three-mile radius circle size, and Kansas used two miles. Circle size per se could theoretically make a significant difference for a given applicant, because "any one proposed well will have a greater impact on potential groundwater mining in a small area than in a large area."[24] Thus, given the same density of existing wells, an applicant in Kansas might conceivably be denied a permit that would be granted with a three-mile radius circle size, all other considerations being the same. I suggested in the article[25] that in general the formulae in these Kansas regulations would likely withstand a judicial attack because they seem to comport with the language of the Appropriation Act[26] governing factors to be considered in granting new applications.[27] On the other hand, I suggested that an applicant might successfully contest a regulation if the applicant could show that the underlying assumptions of some of the factors used in the formulae were false for a particular geographical area.[28] For example, if a water right applicant could show through expert hydrologic testimony that the assumed recharge value in the formulae is less than the actual value for that specific location, the applicant might successfully challenge the legitimacy of the regulation.

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22. KAN. ADMIN. REGS. 5-1-1 (ppp) (Supp. 2005) defines safe yield as follows: "the long term sustainable yield of the source of supply, including hydraulically connected surface water or groundwater." Apparently, this term has fallen out of favor with some water professionals, who use "sustainable use" instead of "safe yield."

23. Fundingsland v. Colo. Ground Water Comm., 468 P.2d 835 (1970); Thompson v. Colo. Ground Water Comm., 575 P.2d 372 (1978).

24. *Kansas GMD's, supra* note 1, at 86.

25. *Id.* at 84-86.

26. KAN. STAT. ANN. § 82a-711(a) (Supp. 2005) states that "in ascertaining whether a proposed use will prejudicially and unreasonably affect the public interest, the chief engineer shall take into consideration . . . (2) the area, safe yield and recharge rate of the appropriate water supply; (3) the priority of existing claims of all persons to use the water . . . ; (4) the amount of each claim . . . and (5) all other matters pertaining to such question."

27. *Kansas GMD's, supra* note 1, at 86.

28. *Id.* at 89-90.

III. DEVELOPMENTS SINCE 1980

A. In General

Much has changed since 1980. Widespread personal and institutional computer use was still on the horizon in 1980. Early record keeping seems in retrospect to have been cumbersome, difficult, and time consuming. Helpful for citizens both inside and outside of GMD's has been the publication of periodic GMD newsletters[29] and individual websites.[30] Besides computers and newsletters, activity affecting groundwater management in the various GMD's as well as at the state level in the period since 1980 has occurred. Moreover, socio-economic and political factors in Western Kansas, the nation, and the world have also affected groundwater use and management.

The following is but a partial list of GMD developments and activities, with others to be described in more detail below and elsewhere in this issue: the imposition of moratoria in some GMD's, closing certain areas to the granting of new water rights permits; changes in GMD's in assumed levels of recharge from rainfall, thus reducing the potential of obtaining a new permit;[31] required metering of wells;[32] implementation by GMD's of cloud seeding programs;[33] modifications by GMD's of depletion formulae to make them more stringent; consummation of memoranda of agreements between DWR and the individual GMD's;[34] and addition by some GMD's of the "baseflow node" concept to be considered in assessing applications for new permits and

29. "Water News" (Western Kansas GMD No. 1); "Equus Beds" (Equus Beds GMD No. 2); "Water District Newsletter" (Southwest Kansas GMD No. 3); "The Water Table" (Northwest Kansas GMD No. 4); and "Groundwater Hi-Lites" (Big Bend GMD No. 5).

30. www.gmd1.org; www.gmd2.org; www.gmd3.org; www.gmd4.org; and www.gmd5.org.

31. For example, the July 1992 issue of the "Equus Beds Groundwater News" reported that based on recent studies Equus Beds GMD No.2 was considering reducing from 6 inches to 3 inches the assumed recharge figure for McPherson County. The current regulation now provides a recharge figure of 6 inches per year in all areas except McPherson County, where it is 3 inches. KAN ADMIN. REGS. § 5-22-7 (Supp. 2005).

32. Southwest Kansas GMD No. 3, for example, first required metering in its revised Management Plan in 1991, which laid out a compliance schedule over the next five years.

33. KAN. STAT. ANN. §§ 82a-1401, *et seq.* (1997 & Supp. 2005) provide the statutory law for weather modification and for licensing entities and activities. The GMD newsletter describes GMD involvement. Western Kansas GMD No. 1, for example, reported in 2004 that it had been involved in cloud seeding for thirty consecutive years. In 2000, Northwest Kansas GMD No. 4 discussed in a special edition of its newsletter the pros and cons of this activity.

34. *See, e.g.*, John C. Peck, *Water Law,* 1995 KAN. ANN. SURV. § 27. DWR entered into MOUs with Western Kansas GMD No. 1 and Northwest Kansas GMD No. 4 on implementing Net Irrigation Requirement (NIR) regulations (*see* note 40, *infra* for a description of NIR); with Big Bend GMD No. 5 on acquiring data through an aquifer testing program in the Rattlesnake Creek Basin; with Equus Beds GMD No. 2 on coordinating efforts to check diversion works for compliance with permit conditions; and with Southwest Kansas GMD No. 3 regarding the GMD's "level of involvement in processing of applications for new permits or for changes in water rights." *Id.* at 247.

for changes, to insure consideration of the effects of a river on recharge.[35]

At the state level, there have been many important developments affecting groundwater management, either directly or indirectly. Activities directly affecting groundwater management include the designation of eight IGUCAs by the Chief Engineer; the imposition of moratoria in some areas outside GMD boundaries, preventing the granting of new water rights permits;[36] the addition of a defined term for "stockwatering" for confined feedlots of 1000 head or more of cattle, to distinguish water used in confined feedlots from that used as a "domestic use"[37]; the creation of flex accounts and water banking;[38] adoption of regulations to control sand and gravel pits;[39] enactment of a statute that gives the chief engineer the power to force conservation measures on existing water rights;[40] and adoption of regulations that create the concept of Net Irrigation Requirement (NIR) in changes of water rights from irrigation to other uses.[41]

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35. *See, e.g.*, KAN. ADMIN. REGS. §§ 5-22-1 (k) and 5-22-7 (Supp. 2005). The baseflow node concept attempts to account for discharge of groundwater into streams. It does so as follows: If the 2-mile radius circle under consideration for a proposed new well has a stream running through any part of the circle, the stream is deemed to have baseflow nodes every 1320 feet of stream reach, and a formula dictates the baseflow allocation based on average annual flow of the stream.

36. *See. e.g.*, KAN. ADMIN. REGS. § 5-3-26, "Closed Townships in Pawnee and Buckner Drainage Basins in Pawnee, Hodgeman, Ness and Finney counties" (2003).

37. KAN. ADMIN. REGS 5-1-1 (Supp. 2005.); KAN. STAT. ANN §82a-701(c) (1997) defines "domestic use" as follows: "the use of water by any person or by a family unit or household for household purposes, or for the water of livestock, poultry, farm and domestic animals used in operating a farm, and for the irrigation of lands not exceeding a total of two (2) acres in area for the growing of gardens, orchards and lawns."

38. KAN. STAT. ANN.§ 82a-736 (Supp. 2005) (flex accounts) and KAN. STAT. ANN.§§ 82a-761 to 773 (Supp. 2005) (water banking).

39. KAN. STAT. ANN. § 82a-734 (Supp. 2005); KAN. ADMIN. REGS. § 5-1-1 (qqq) (Supp. 2005) (definition of sand and gravel pit operations); KAN. ADMIN. REGS. §§ 5-13-1, *et.seq.* (2003 & Supp. 2005).

40. KAN. STAT. ANN.§ 82a-733 (1997). That section was enacted in 1991. New permits now typically contain the following condition: "[T]he Chief Engineer specifically retains jurisdiction in this matter with authority to make such reasonable reductions in the approved rate of diversion and quantity authorized to be perfected, and such changes in other terms, conditions, and limitations set forth in this approval and permit to proceed as may be deemed to be in the public interest." However, for water rights prior to the enactment of the conservation plan statute in 1991, any forced pumping reduction by the chief engineer not pursuant to a call by a senior water right holder would arguably be subject to the same constitutional takings question posed above in Section II on IGUCA's. *But see Property Rights, supra* note 15, for a discussion of the evolution of the jurisprudence of water rights as property rights, including application of the Public Trust Doctrine, and the lawful powers to cut back pumping to prevent waste of water. *See also* Section III.B.1., *infra*, which describes pump reduction in an IGUCA order.

41. KAN. ADMIN. REGS. §§ 5-5-10 to -12 (2003). The Net Irrigation Requirement (NIR) is the annual net water in inches required to grow corn. The NIR takes precipitation into account. Because annual precipitation is lower in Western Kansas than in Eastern Kansas, the NIR for Barton County in West Central Kansas, for example, is 12.6 inches; the figure for Douglas County in Eastern Kansas is 6.8 inches. The regulation contains a formula that amounts to multiplying the NIR by the number of acres irrigated to derive the amount of water necessary to

Other state activities have affected groundwater management less directly, but are still important: the imposition of criminal sanctions for diverting water in Kansas without a permit;[42] the evolution of a proactive water planning process run by the Kansas Water Office;[43] the filing and virtual completion of two interstate water suits that involved the interrelationship between groundwater and surface water;[44] case law and legislation transforming the State Board of Agriculture to the Kansas Department of Agriculture, with appointments by the governor rather than elections by farm groups;[45] creation of minimum streamflow legislation;[46] a legislative change from three years to five years of non-use for water rights to be deemed abandoned;[47] the enactment and later amendment of the Water Transfer Act,[48] which creates special rules for the movement of 2,000 acre-feet (a.f.) or more of water thirty-five miles or more; the imposition of civil penalties of up to $250 on water right holders for failing to file annual use reports;[49] the creation of the Water Rights Conservation Program (WRCP) in 1992, comparable to the Federal Conservation Reserve Program (CRP) for land;[50] the legislative requirement in 1999 that DWR eliminate all written "policies and procedures" and change them into regulations;[51] more explicit explanation on how the "public interest"

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grow corn, which is also the amount of water consumed. Because only the amount of water consumed under a water right can be transferred, this derived figure thus represents the amount of water that can be transferred. For example, if an irrigator has a water right for 160 acre feet of water on a 120 acre tract, and the irrigator wants to sell the water right to a city and retain the land, the city will have to obtain permission under KAN. STAT. ANN. § 82a-608b (1997) to change the place of use, type of use, and the point of diversion. The city might be able to acquire and use only 137 acre feet, not 160 acre feet, of water under this policy. The contracting parties and their lawyers must take this consideration into account in negotiating the contract.

42. KAN. STAT. ANN. § 82a-728 (1997). Exceptions to this rule include water pumped for domestic use, saltwater pumped in connection with oil and gas wells, and water pumped in quantities less than 15 acre feet of surface water annually to be impounded in reservoirs holding less than 15 acre feet of water.

43. KAN. STAT. ANN. §§ 82a-901a, *et seq.* (1997). An important section is Section 906, which charges the Kansas Water Office with submitting an up-dated water plan annually to the governor and legislature. *See Legal Aspects, supra* note 15, at 205-217.

44. Kansas v. Colorado, 514 U.S. 673, (1995); Kansas v. Colorado, 533 U.S. 1, (2001); Kansas v. Colorado, 125 S.Ct. 526 (2004). Kansas v. Nebraska, 538 U.S. 720 (2003) (approval of final settlement stipulation); Kansas v. Nebraska, 540 U.S. 964 (2003) (approval of final chapter of Special Master's Report certifying adoption of the RRCA Groundwater Model).

45. Hellebust v. Brownback, 42 F.3d 1331 (10th Cir. 1994); 1995 Sess. Laws, ch. 236, codified at KAN. STAT. ANN. § 74-560 (2002).

46. KAN. STAT. ANN. §§ 82a-703a, -703b, & -703c (1997).

47. 1999 Kan. Sess. Laws ch. 122, § 1, found at KAN. STAT. ANN.. § 82a-718 (Supp. 2005).

48. KAN. STAT. ANN. §§ 82a-1501, *et seq.* (1997 & Supp. 2005).

49. KAN. STAT. ANN. § 82a-732 (Supp. 2005.).

50. KAN. ADMIN. REGS. §§ 5-7-4 & 5-7-4a (2003). The WRCP enables water right holders to contract with DWR to conserve water and not pump their water rights. During the term of the WRCP contract, DWR will not consider the failure to pump water as a non-use of water that would otherwise trigger an abandonment.

51. KAN. STAT. ANN. § 82a-1904 (Supp. 2005).

is determined in granting permits;[52] the creation of situations in which decisions of the chief engineer can be appealed under the Kansas Administrative Procedures Act (KAPA);[53] prescription of civil penalties for violations of the Water Appropriation Act, of orders relating to IGUCAs, or of conditions of water rights;[54] and the fine-tuning of the quantities considered reasonable for irrigation use across Kansas, from three general categories to specific quantities by county in gradations of tenths of an inch.[55]

Still other indirect forces have affected groundwater use and management in the last twenty-five years. Federal farm policy regarding grain subsidies have a bearing on groundwater extraction.[56] Recent dramatic increases in fuel costs worldwide have affected irrigation in Western Kansas, causing farmers to lose farm income,[57] which creates incentives to adopt more efficient irrigation methods,[58] change from natural gas to electricity,[59] sell out, or move from irrigation to dry-land farming.[60] Disasters such as 9/11 or possible mad-cow disease cause cities[61] and industries to be vigilant, lest a terrorist or disease

52. KAN. ADMIN. REGS. § 5-3-9 (2003) states the following: "(a) In accordance with K.S.A. 82a-711(b)(5), as amended in ascertaining whether a proposed use will prejudicially and unreasonably affect the public interest, the chief engineer shall also take into consideration the quantity, rate and availability of water necessary to: (1) satisfy senior domestic water rights from the stream; (2) protect senior water rights from being impaired by the unreasonable concentration of naturally occurring contaminants; and (3) over the long term reasonably recharge the alluvium or other aquifers hydraulically connected to the stream. (b) Unless otherwise provided by regulation, it shall be considered to be in the public interest that only the safe yield of any source of water supply, including hydraulically connected sources of water supply, shall be appropriated."

53. KAN. STAT. ANN. § 82a-1901 (Supp. 2005). The Kansas Administrative Procedure Act is found at KAN STAT. ANN.§§ 77-501, et seq. (Supp. 2005).

54. *Id.*. § 82a-737 (Supp. 2005)

55. KAN. ADMIN. REGS. § 5-3-24 (2003).

56. *See, e.g.*, BURKE, J. & MOENCH, M., GROUNDWATER AND SOCIETY: RESOURCES, TENSIONS AND OPPORTUNITIES, U.N. Dept. of Econ. and Soc. Affairs (DESA), and the Inst. for Soc. & Environ. Transition (ISET) (2000), at 12. (hereinafter GROUNDWATER AND SOCIETY): "The proximate causes of groundwater depletion and pollution . . . are rooted in population growth, economic expansion, the distorting impacts of subsidies and financial incentives, and the spread of energized pumping technologies."

57. *See* Hegeman, Roxana, Assoc. Press, *National farm-income forecast bleak, lower payments mean $20B less than 2005,* (March 11, 2006), *available at* http://www.modbee.com/ag/story/11919412p-12686865c.html.

58. *See* AgNews, News and Public Affairs, Texas A&M U. Sys. Ag. Prog., *available at* http://agnews.tamu.edu/dailynews/stories/SOIL/Apr2805a.htm.

59. Roxana Hegeman, *High fuel costs projected to slash farm incomes,* Roxana Hegeman, ASSOC. PRESS, *at* http://petroleum.berkeley.edu/patzek/BiofuelQA/Materials/kansasfarmers 112505i.htm (last visited September 15, 2006).

60. *See, e.g.*, E. Fischer, Remarks at Natural Gas Hearing, Feb. 26, 2001, Railroad Comm. of Texas, *available at* http://www.rrc.state.tx.us/ngh/fischer.html.

61. *See* Public Health Security and Bioterrorism Preparedness and Response Act of 2002, Pub. L. No. 107-188, 116 Stat. 594 (requiring community water systems to assess their vulnerability to terrorist attack and complete emergency response plans); *see also* Municipal Research and Services Center of Washington, *Homeland Security – Preparing for Possible Terrorist Incidents, at* http://www.mrsc.org/Subjects/PubSafe/emergency/EM-Terrorism.aspx

affect, indeed shut down, a whole industry or municipal water system. Long-term droughts have triggered drought response planning.[62]

B. Significant Activities and Developments

The above listing of activities shows the breadth of activities by the GMD's and the state over the last twenty-five years regarding groundwater management. Discussed in this section are several other developments in which GMD's have participated.

1. The Walnut Creek IGUCA

The Chief Engineer established the Walnut Creek IGUCA in 1992, after extensive hearings held in Great Bend in 1990 and 1991. The problem lay in the inability of the Kansas Department of Wildlife and Parks to satisfy its senior rights to surface water from the Arkansas River and its tributary, Walnut Creek. These rights provide water for the Cheyenne Bottoms, an important wildlife area providing a stopover place for migratory birds. These rights could not be satisfied, allegedly due to the pumping by irrigators of alluvial groundwater from Walnut Creek, upstream from the Cheyenne Bottoms.

Twelve parties participated in the IGUCA hearings, including farmers groups, cities, DWR, environmental groups, Big Bend GMD No. 5, and others. Professionals from DWR testified and provided data. The manager of GMD No. 5 testified, as did a board member and a GMD hydrologist. The GMD's lawyer was an active hearing participant. The manager testified that the GMD was participating in the hearing as an "unbiased entity" and that the GMD, while it had a safe yield policy, was not prepared to make a recommendation regarding safe yield in an IGUCA. But the GMD staff had held meetings with the public prior to the IGUCA hearings; the staff had testified that discharge exceeded recharge in the basin; had recommended that an IGUCA be established due to the declining water levels, based on data from the United State Geological Survey, the Kansas Geological Survey, and DWR; and had participated with DWR in the process of suggesting boundaries for the proposed IGUCA.

Ultimately, the Chief Engineer established the Walnut Creek IGUCA. The Order determined that basin-wide safe yield was 22,700 a.f. per year, and that pumping was double that amount. The order then established two broad categories of water rights, with October 1, 1965 as the date of demarcation. With a goal of achieving safe yield in the basin, the Order cut the "Senior Rights" with priorities before that date between 22 and 33 percent, depending

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(last modified Oct. 5, 2005); *see also* American Public Works Association, *Attention Municipal Water Systems! DHS water system survey*, *at* http://www.apwa.net/N2U/index.asp?HotID=788&MODE=ARCHIVE&HotLocator= (March 12, 2005); *see also* Frank Pisciotta, *Protecting Our Water Systems in the Age of Terror*, *at* http://www.securityinfowatch.com/article/article.jsp?siteSection=392&id=7550 (Updated March 15, 2006).

62. Kansas Water Office, *Operation Plan-Governor's Drought Response Team*, *at* http://www.kwo.org/KWO%20Programs/Drought_op_plan.pdf (last visited April 20, 2006).

on their location within the IGUCA. It cut "Junior Rights" from 64 to 71 percent. Vested rights were not affected. The Order reduced senior water right pumping on the basis that irrigators could efficiently irrigate in this region with smaller annual quantities of water. The Order reduced the Junior Rights, in contrast, both to promote efficiency and to achieve safe yield in the basin. The irrigators initially filed an appeal to the district court, claiming an unconstitutional taking of property. But they later settled the case, leaving Kansas without a court decision on the propriety of these kinds of forced pump reductions.[63]

2. The Rattlesnake Creek Management Program[64]

South of the Cheyenne Bottoms area is the Quivira National Wildlife Refuge. The U.S. Fish and Wildlife Service operates this wetlands area, in part by pumping supplemental water from Rattlesnake Creek. In 1994, perhaps spurred by the results of the Walnut Creek IGUCA, four entities began to negotiate to solve similar problems of satisfying rights adversely affected by groundwater pumping irrigators. These entities and their express objectives[65] are as follows: (1) The U.S. Fish and Wildlife Service (seeking to assure adequate water for the management of Quivira National Wildlife Refuge); (2) DWR (seeking to manage the water according to the Act); (3) Big Ben GMD No. 5 (seeking to preserve and manage sustained yield of water for all water users in the basin); and (4) the Water Protection Association of Central Kansas, (Water PACK) (seeking to manage and encourage the conservation of water for all water within the basin to meet the needs of irrigated agriculture and other water users in the basin). They sought to "develop and implement solutions to water resources problems within the . . . basin."[66] In 2000, the Partnership announced a management program with goals of "long-term sustainable management" and "stability in groundwater declines."[67] Strategies included a water right purchase program, a water banking program, and a flexible account system for water rights, the latter two of which the legislature has created.[68]

3. The Wichita Aquifer Storage and Recovery Project

After studying various options to enhance its long-term water supplies, including diverting water from the Kansas River Basin, the City of Wichita embarked on a pilot project in the late 1990s on "aquifer storage and recovery" (ASR). This project involved diverting water during above-normal flows from

63. *See supra* text accompanying note 18.

64. For more detail *see Property Rights, supra* note 15, at 500-501.

65. *Id.* at 500; *see also* Rattlesnake Creek Basin/Quivira Partnership Agreement, at Partners Objectives (June 1994) (on file with author).

66. Rattlesnake Creek Basin/Quivira Partnership Agreement, Partners Objectives, June 1994, *at* Goals of Partnership.

67. Rattlesnake Creek/Quivira Partnership, *Rattlesnake Creek Management Program Proposal* (June 29, 2000).

68. *See Property Rights, supra* note 15, at 500-501; *see also* KAN. STAT. ANN., 82a-734 (Supp. 2005).

the Little Arkansas River Basin near Halstead and pumping it back into the Equus Beds Aquifer. Ultimately, Wichita wants to pump this water back out from the Equus Beds for municipal use. While it is possible that the then-existing DWR and GMD regulations would have sufficed to allow this project, DWR and the Equus Beds GMD No. 2 crafted and promulgated regulations designed for ASR projects in general.[69]

In 2003, Wichita filed applications to divert and store water for the first phase of its long-term project. The GMD board and staff raised concerns, which led to several modifications in the overall ASR Project. The GMD board and staff were heavily involved in the approval process for those permits. Ultimately, Wichita and the GMD board came together to present testimony at the DWR hearing in December 2004. The GMD Board's participation and recommendations, as well as the information gained at a public hearing, assisted DWR in giving final approval of these permits in 2005. Only higher-than-normal-flow water will be diverted for recharge. Not only will the project provide water for the benefit of Wichita and the area irrigators, but its design provides an hydraulic barrier to impede the migration of the salt water plume moving toward the Wichita well field.

4. Other Sustainability Endeavors

GMD's, DWR, the Kansas Water Office, and others have tried to move Western Kansas in the direction of sustainability with other endeavors. Now discarded, the "Two-Pool" Approach[70] would have created an upper "useable pool," which would be available for current water right holders until exhausted. The lower "conservation pool" would have been more heavily regulated, would have had to satisfy safe-yield criteria, and would have been available for drinking water and other basic needs. Opposition killed the proposal in 2001.

The Kansas Water Office, the Kansas Water Congress, and others have proposed the Irrigation Transition Assistance Program (ITAP), to conserve and extend the life of the Ogallala by managing subunits, and retiring water rights by purchasing them using money from various sources, including the Federal and state governments. ITAP has been the subject of bills before the Kansas Legislature.[71] Conceived of and encouraged by Northwest Kansas GMD No. 4, the Northwest Kansas Groundwater Conservation Foundation is an IRS § 501 (c)(3) entity seeking private grant monies to move irrigated land to dry-land. The Foundation has several options, including buy-outs of water rights, temporary set-asides of water rights, and a 10% reduction of past historical pumpage. The Foundation has approved an initial set of policies and has identified nineteen potential grant sources.[72]

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69. KAN. ADMIN. REGS. §§ 5-12-1, *et seq.* (2003).

70. *See Property Rights, supra* note 15, at 501, 505-506.

71. *See, e.g.*, H.B. 2710, 2006 Sess. Laws (Kan. 2006).

72. *See* John C. Peck, *Groundwater Management District (GMD) Activities*, 2003 KAN. ANN. SURV. § 29-V; *see also* John C. Peck, *Groundwater Management District (GMD) Activities*,

IV. IS INSTITUTIONAL GROUNDWATER MANAGEMENT WORKING IN KANSAS?

The answer to the question may depend in part on what the person answering means by "management" and "working," and in part on the person's background, biases, perspective, and perhaps even present employment. According to Webster, to "manage" is "to handle or address with a degree of skill" or "to treat with care."[73] If something "works" it "produce[s] a desired result . . . [it] . . . succeed[s]".[74] The question then is whether we are handling the aquifer with skill, treating it with care, producing a desired result, and succeeding. Some light may be shed on this question by using several approaches: ascertaining the legislative intent of the GMD Act by seeing what it prescribed as its express goals and objectives, and asking whether those goals and objectives are being met; pointing out some of the potential weaknesses in the GMD approach; and finally, asking whether the time is right for a new, detailed economic analysis of the Act and its administration in light of our current situation.

A. Express Legislative Goals and Objectives

The 1972 GMD Act enabled groundwater management districts to be formed, while at the same time it preserved basic water use doctrine. The Act provided the reasons for "establish[ing] the right of local water users to determine their destiny with respect to the use of the groundwater:"[75]

> for the conservation of groundwater resources; for the prevention of economic deterioration; for associated endeavors within the state of Kansas through the stabilization of agriculture; and to secure for Kansas the benefit of its fertile soils and favorable location with respect to national and world markets.[76]

At that time, Kansas was still in a "development" period with respect to its water resources. An economic study published in 1955 pushed the idea of developing the irrigation capacity of the state to help overcome erratic rainfall in Western Kansas and thus to stabilize farm income.[77] The water appropriation permit applications, however, were arriving in great numbers, and by the late 1960's there was a felt need in the legislature to begin to manage and conserve groundwater. This experience was not unlike the history of water use and development in the Western United States in general in the

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2004 KAN. ANN. SURV. § 29-V; *see also* John C. Peck, *Groundwater Management District (GMD) Activities*, 2005 KAN. ANN. SURV. § 29-V.

73. WEBSTER'S NEW COLLEGIATE DICTIONARY, 691 (1981).

74. *Id.* at 1341.

75. KAN. STAT. ANN. § 82a-1020 (1997).

76. *Id.*

77. Richard Pfister, ECONOMIC DEVELOPMENT IN SOUTHWESTERN KANSAS, PT. IV, WATER RESOURCES AND IRRIGATION 98-100 (School of Business-Bureau of Business Research ed., University of Kansas 1955).

20th Century,[78] indeed in the world,[79] a movement from a period of development to a period of attempted conservation and sustainability.

The first statutory goal is "conservation of water resources." Not defined in the Act, the term "conservation" could have a range of meanings, from merely the "wise use of natural resources," to "the act of preserving . . . natural resources," to "achieving the use of less . . . either by using more efficient technologies or by changing wasteful habits," and, finally, to "the use of natural resources in a way that ensures their continuing availability to future generations."[80] An examination of the types of GMD regulations put in place and the results of those regulations and other DWR policies and actions show that the conservation goal has probably been the guiding principle behind the policies. Innovations include, among others, well spacing, safe yield and depletion formulae, prohibitions against waste, imposition of conservation plans, metering requirements, new moratoria on permits, the requirement of annual use reports, criminal sanctions for using water without a permit, establishment of several IGUCAs, and strict enforcement of rules on abandonment of water rights and on the no-increase-in-consumption rule for changes in water rights[81] (as illustrated primarily in the Net Irrigation Requirement).[82] These actions have combined to reduce waste and the rate in the numbers of new permits granted. After decades of increases, annual pumping from groundwater in Kansas has leveled off.[83] These policies and innovations have probably slowed down the rate of depletion in some areas, thus meeting some of the possible definitions of conservation. However, we are not insuring "continued availability for future generations," as evidenced by continued mining, changes in water table depth, and declines in saturated thickness of the aquifer in many areas.[84]

The other statutory goals seem less clear in suggesting specific policy directions: preventing economic deterioration, stabilizing agriculture, and securing the benefit of Kansas's fertile soils and favorable location with

78. *See generally* REPORT OF THE WESTERN WATER POLICY REVIEW ADVISORY COMMISSION, WATER IN THE WEST: CHALLENGE FOR THE NEXT CENTURY Ch. 2 & 3 (June 1998); see also GROUNDWATER EXPLOITATION IN THE HIGH PLAINS Ch. 3 & 5 (David E. Kromm & Stephen E. White eds., 1992) [hereinafter GROUNDWATER EXPLOITATION].

79. "The vulnerability of aquifer systems has spurred significant concern for the environmental impacts of groundwater resource depletion, quality and pollution. In developed countries this had led to a shift away from new groundwater development to groundwater management and protection, leading in turn to a much greater emphasis on understanding groundwater processes." Burke & Moench, *supra* note 56, at 38 (citation omitted).

80. *Definitions of Conservation on the Web*, *at* http://www.google.com/search?hl=en&lr&01=defmore&defl=en&q=define:Conservation (last visited Apr. 17, 2006).

81. KAN. ADMIN. REGS. § 5-5-3 (2003).

82. *Id.* § 5-5-11 (2003); *See also supra* note 41.

83. PERSPECTIVES ON SUSTAINABLE DEVELOPMENT OF WATER RESOURCES IN KANSAS, Sophocleous, M., ed., Bull. 239 (1998), at 29.

84. *See, e.g.*, GROUNDWATER EXPLOITATION, *supra* note 78, at 45-51; *see also* the information provided by the Kansas Geological Survey, *available at* http://www.kgs.ku.edu/Publications/Bulletins/ED10/06_wells.html.

respect to national and world markets. These purposes appear to be tied to the goal of water conservation, and yet in a way they seem antithetical to it. Perhaps they just suggest outcomes of conservation or perhaps the legislature meant to imply "in other words" between the conservation goal and the others. But, just as it would not do in 1972 when the legislature enacted the GMD Act to permit unbridled, wasteful use of groundwater and thus to permit an early total depletion of the aquifer, so also would it not do to shut down all uses of the water then or today on the pretense of saving all the water for future generations. Surely the legislature sought a balance with these goals for DWR and the GMD's: manage and use the water wisely, preserve water for future generations by encouraging and mandating conservation and preventing waste, but do not destroy the economy of Western Kansas for this generation by a too abrupt curtailing of pumping.[85] A hypothetical national or state government with unfettered planning and implementation powers, unrestrained by constitutional limits on taking of private property, might conceive of arguably better uses of this groundwater than its current, primarily agricultural uses, in large part for irrigating crops to feed cattle for beef consumption in this country and abroad.[86] Some have suggested that as the world population increase puts new demands on agriculture to produce sufficient food supplies, a better and more efficient use of land and water would be for the open range grazing of cattle, not the feeding of grain to confined cattle, and for production of grains for direct human consumption rather than for cattle feed. They argue that it takes far less water and other inputs to produce a quantity of protein from humanly consumable soybeans than to produce the same quantity of protein from confined cattle fed by crops produced with irrigation water.[87] We

85. GROUNDWATER AND SOCIETY, *supra* note 56, at 146 (commenting on methods of groundwater management in various parts of the world and stating the following in regard to the High Plains area: "Because recharge is low, in most cases management in the High Plains focuses on planned depletion rather than sustainable maintenance of the groundwater resource base. Sustainability would, in many areas, require reducing use to the point where groundwater could no longer serve as a major resource for irrigated agriculture. A planned depletion approach seeks to enable orderly transition of the regional economy as groundwater resources gradually decline.")

86. GROUNDWATER EXPLOITATION, *supra*, note 78, at 60-61 ("Ironically, while our nation's farmers are confronting agricultural surpluses, low crop prices, reduced land values, and foreclosures, we are systemically mining a virtually nonrenewable resource to produce more in a time of plenty. At the national scale it might seem prudent to conserve High plains groundwater for future generations, but at the individual or local level, irrigated agriculture is often perceived as necessary for survival.").

87. "From one ecologist's perspective, the American system of farming grain-fed livestock consumes resources far out of proportion to the yield, accelerates soil erosion, affects world food supply and will be changing in the future. 'If all the grain currently fed to livestock in the United States were consumed directly by people, the number of people who could be fed would be nearly 800 million,' David Pimentel, professor of ecology in Cornell University's College of Agriculture and Life Sciences, reported . . . .' Animal agriculture is a leading consumer of water resources in the United States . . . . Grain-fed beef production takes 100,000 liters of water for every kilogram of food. . . . In comparison, soybean production uses 2,000 liters for kilogram of food production . . . . Livestock directly use only 1.3 percent of [the fresh water consumed in the U.S.] each year. But when the water required for forage and grain production is included, livestock's water usage

do not live in that hypothetical, centrally-planned state, however. We live in a market-driven economy with constitutionally protected property rights, which include water rights, and a water law dedicating the water resource to the use of the public, with the chief engineer charged with the duty of not only regulating and conserving, but also allotting and aiding in the distribution of the water resources of the state.

B. Some Weaknesses in the GMD Approach

Even if one concludes that the Kansas groundwater management approach has succeeded to some extent in reaching the legislative goals, one can also point to several weaknesses in the system. The questions arise whether the legislature gave too much power to local water users to manage groundwater; whether the regulations to control and conserve groundwater have been too weak; and whether the Water Appropriation Act itself, as opposed to the GMD Act, ultimately provides the potential solution for slowing down aquifer decline.

1. Is the fox guarding the chicken house?

Only certain landowners and water users can actively participate in the establishment and management of Kansas GMD's.[88] One criticism of the enabling legislation is the "fox guarding the chicken house" argument, suggested in an unpublished 1981 KU law student paper by Ernest Boles[89] and others.[90] Boles argued that when the legislature empowered local water users to "determine their destiny with respect to the use of the groundwater,"[91] it created a problem:

> . . . the legislature apparently intended to enable local areas with or anticipating groundwater depletion problems to organize in order to

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rises dramatically." Cornell University Science News, *available at* http://www.news.cornell.edu/releases/Aug97/livestock.hrs.html; "Producing 1 kg of animal protein requires about 100 times more water than producing 1 kg of grain protein." David Pimentel & M. Pimentel, *Sustainability of meat-based and plant-based diets and the environment*, The Amer. J. of Clinical Nutrition (Sept. 2003), *available at* http://www.ajcn.org/cgi/content/full/78/3/660S; *See also* LAPPE, F.M., DIET FOR A SMALL PLANET (1971) *and* W. SHURTLEFF & A. AOYAGI, THE BOOK OF TOFU (1975).

88. The GMD Act defines "eligible voter" as an adult person who owns forty contiguous acres or uses at least one acre-foot of water per year. *See* KAN. STAT. ANN. § 82a-1021(Supp. 2005). Eligible voters first file an intention to form a GMD, and then 50% of the eligible voters must sign a petition describing the proposed GMD. Eligible voters then vote whether to form the GMD. A steering committee of eligible voters helps get the GMD up and running. The board of directors is elected by eligible voters. Statutory powers of the GMD given in KAN. STAT. ANN. § 82a-1028 (Supp. 2005) are exercised by the board. In short, landowners and water users manage the GMD.

89. Ernest Boles, An Evaluation of Kansas Groundwater Management Law, 23-24 (Fall, 1981) (unpublished manuscript, on file with author) [hereinafter *An Evaluation*].

90. "Stakeholder participation alone is no guarantee that wider public interest matters will be addressed, since stakeholders invariably have a degree of self-interest." GROUNDWATER AND SOCIETY, *supra* note 56, at 101.

91. KAN. STAT. ANN. § 82a-1020 (1997).

> develop management plans to conserve groundwater. In the abstract, this policy would appear consistent with the purposes of management and conservation. In practice, its effectiveness is eroded by economic and political conflict of interest.
>
> This economic and political thicket has two primary aspects. First, in placing the decision making at the local level, those in the position to implement stringent conservation measures likewise stand the most to lose where stringent conservation measures are implemented. Second, because of the voting eligibility requirements, the local users most affected by stringent conservation measures, likewise possess the greatest voting influence in creating and administering the GMD. Therefore, it is arguable whether local decision making is a viable method of managing and conserving the state's groundwater resources.[92]

Though noting some counter arguments to his position,[93] Boles may be correct in his observation of an apparent inherent conflict of interest in having boards of directors made up primarily of irrigators, other water users, and land owners. No positions on the boards are reserved for other stakeholders, such as environmentalists, city dwellers, businesses not using substantial quantities water or not holding water rights, or the public at large. In other parts of the world, local stakeholder participation in groundwater management is generally encouraged in groundwater management efforts:

> Many participants in management debates advocate broad-based 'participatory' approaches due to philosophical considerations related to governance. From this perspective, broad-based participation by all stakeholders is viewed as an essential mechanism to counterbalance special interests and governmental excess.[94]

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92. *An Evaluation*, *supra* note 89, at 23-24 (with permission of the author).

93. "The counterargument could be made that in the long run, the local users stand the most to lose if conservation measures are not implemented, in that they could potentially lose their water resource. This was probably the underlying theory upon which the legislative decision was made to place the decision making at the local level. In practice, it loses its relevance when one considers (1) the economic considerations of high capital outlays in the form of irrigation equipment which must be recouped by local users through increased production is only possible with continued wide spread irrigation, and (2) the time value of money. As is said, 'A bird in the hand is worth two in the bush.' This theory finds support, although ironically in criticism presently being levied at GMD No. 3, where a group of eligible voters are seeking dissolution of the district. * * * " *Id.* at note 105. In respect to the eligible voters who sought to dissolve the district, "these voters object to the depletion criteria established by the district's board, as well as to the statutory authority which empowers the GMD to deny appropriation applications. These complaints are ironic in their anticonservation thrust. * * * [T]he criticism thrust at the existing GMD No. 3 . . . demonstrates that the GMD is in fact conservation oriented, at least more so than some of its eligible voters would prefer." *Id.* at note 92.

94. GROUNDWATER AND SOCIETY, *supra* note 56, at 8. "Because groundwater is a common-property resource and the de facto power to control its condition effectively is dispersed among users, stakeholder involvement . . . [is] essential for any attempt to manage the resource base. . . . It is essential to . . . involve two types of stakeholder groups: (1) those whose actions individually or as a group have a major impact . . .; and (2) those whose interests will be

But, in those recommendations, stakeholders in groundwater management include ". . . all users, institutions and those affected by use and management who collectively or individually hold a 'stake' in the resource and the way it is managed."[95] The Kansas experiment with local governance in groundwater management seems to be in line generally with international management recommendations that emphasize local versus central management, at least in spirit. But the lack of broad stakeholder membership in GMD boards may be a weakness of the GMD Act. A legitimate question is whether Kansas GMD stakeholder participation is broad enough–i.e., whether the eligible voters and board membership include enough of the "users, institutions, and all affected by use and management." One could argue that more broad-based boards or more objectively- and neutrally-constituted boards might have attempted to close areas to new permits earlier, established even stricter circle formulae, sought establishment of more IGUCAs, or sought a test case that would use the prior appropriation doctrine itself as a tool to curtail overpumping, as described in the next section. Even with broader stakeholder board membership and voting participation, however, and even if such boards had wanted to impose even more curtailment of groundwater pumping, those GMD boards would have faced the same constitutional "takings" obstacles DWR faces.[96] In short, Kansas has followed the recommendation of having local management with stakeholder participation, but that participation has been fairly narrowly drawn. Moreover, the legislature's taking away of GMD powers to enforce standards and policies in 1999 was a backtracking from the original policy goal of local stakeholder participation.[97]

2. Are Regulations too strict or too lax?

Kansas groundwater law has evolved through three periods. The first period was from statehood to 1945, when there was virtually no state control and the common-law "absolute ownership" doctrine dominated, recognizing that the surface owner owned the underlying groundwater as well.[98] Second, a "development" period existed from 1945 to 1972, when all the water in Kansas, both groundwater and surface water, was controlled by the Chief Engineer, the water having been declared "dedicated to the use of the people of the State of Kansas" by the 1945 Water Appropriation Act.[99] The third period is the period since 1972, when the GMD's have had some control; but the Appropriation Act has remained as basic water policy–when conservation and management instead of development have been the focus, leading to changes

significantly affected . . . . The first category generally consists of large water users . . . and agricultural interests. They tend to be relatively well organized and have substantial social, economic and political power. The second category tends to be much more dispersed and . . . less socio-economically powerful. It includes diverse interests ranging from small farmers to peri-urban dwellers to environmental non-governmental organizations." *Id.* at 126.

95. *Id.*

96. *See supra* notes 14-18 and accompanying text.

97. *See supra* note 21.

98. *See supra* Sec. II.

99. KAN. STAT. ANN.§ 82a-702 (1997).

from agricultural uses to municipal and industrial uses.[100] If pumping is factored in, this evolution can be stated another way. Prior to 1945, there was unregulated groundwater pumping, albeit in relatively low total quantities. From 1945 to 1972, groundwater pumping increased with the advent of powerful pumps and center pivot irrigation,[101] but with the required prior approval of the Chief Engineer. And from 1972 until today, a leveling off of pumping has occurred, as the GMD's and the chief engineer have greatly curtailed the rate at which new permits have been obtained.[102]

While some GMD regulations employing the circle tests attempt to implement "safe yield," mining already existed in many areas when these DWR and GMD regulations first became effective. These regulations gave the chief engineer valid reasons to deny a permit application, but they did little to curtail the already-existing mining problems. This is not the fault of the regulations or the statute. After all, it was because mining was taking place already that the legislature enacted the GMD law in the first place. But constitutional constraints on taking of property rights have limited the legislature, DWR, and the GMD's from making drastic changes in the groundwater mining situation. These matters need not be detailed here,[103] but Kansas's expressly defining water rights as "real property rights," thereby protecting them against "takings" by the government, has acted as a deterrent to retroactive restrictions of water right pumping.

3. An "Unused appropriation doctrine?"

Another consideration is that while "takings" issues may have precluded the imposition of stringent pumping regulations on existing rights, the prior appropriation doctrine itself may yet be an unused tool for slowing depletion of the aquifer. Kansas lacks an appellate court case that has treated the issue of whether "impairment" under Section 711 of the Water Appropriation Act includes the long-term lowering of the regional aquifer by numerous junior pumpers as opposed to direct impairment of a water right by a neighbor. Were a Kansas court to opine that impairment does include this long-term lowering of the water table, this action might invite further suits by very senior right holders to enjoin junior right holders, even those not located in the direct proximity of the senior rights.

Two non-Kansas cases on the issue of general impairment claims by

100. These changes are seen elsewhere as well. *See, e.g.*, GROUNDWATER AND SOCIETY, *supra* note 56, at 46.

101. *See generally* The Center Pivot, A Robot for Production Agriculture, *at* http://www.public.iastate.edu/~mwps_dis/mwps_web/pdf_files/CenterPivot.doc (for a description of the invention and the inventor Frank Zyback, a Nebraskan living in Strasburg, Colorado, in 1952); *see also* GROUNDWATER EXPLOITATION, *supra* note 78 at 110-144.

102. *See* text accompanying note 83, *supra.*

103. *See Property Rights*, *supra* note 15 at 501-506; *see also* John C. Peck, *Protecting the Ogallala Aquifer in Kansas from Depletion: The Teaching Perspective*, 24 J. LAND RESOURCES & ENVTL. L. 349 (2004); *see also* Peck, *Legal Aspects of Water Resources Planning*, *supra* note 15, at 238-280.

senior appropriators in areas controlled by depletion statutes or administrative declarations illustrate the difficulty of predicting an outcome of the potential viability of such a claim in Kansas. In *Baker v. Ora-Ida Foods, Inc.*,[104] the Idaho Supreme Court upheld a lower court opinion that had shut down approximately sixteen wells in an aquifer in favor of four senior appropriators. That aquifer was small and capable of a metes and bounds description. The court distinguished between rechargeable and non-rechargeable aquifers:

> In a non-rechargeable aquifer the water is simply a stock resource and it can reasonably be determined when it will be totally exhausted. Decisions must be made as to whether to use it, when to use it and how to use it. . . . A rechargeable aquifer, however, is a flow resource, and the real problem is how best to utilize the annual supply without overdrafting the stock which maintains the aquifer's water level.[105]

The court held that the Idaho Groundwater Act forbids mining a rechargeable aquifer and that the four senior appropriators would exhaust the aquifer's entire annual recharge.

The second case is a New Mexico case involving an application to pump from the Ogallala Aquifer. The court in *Mathers v. Texaco, Inc.*[106] upheld the State Engineer's approving of a permit application based on his determination of permissible groundwater withdrawals in the basin: "In determining what constitutes full appropriation in each township, and thus in the basin as a whole, he calculated the amount of water that could be withdrawn from each township and still leave one-third of the water in storage at the end of forty years."[107] The court concluded that the waters in the basin are replenished only by very limited surface precipitation and that

> [t]hus, for all practical purposes, no recharge takes place, and the pumping of any water . . . depletes the . . . supply . . . and in effect amounts to . . . mining . . . . The administration of a non-rechargeable basin, if the waters therein are to be applied to a beneficial use, requires giving the . . . supply . . . a time dimension or . . . the fixing of a rate of withdrawal which will result in a determination of the economic life of the basin at a selected time.[108]

The court held that "a lowering of the water level in the wells of protestants [existing senior water right holders], together with the increase in pumping costs and the lowering of pumping yields, does not constitute an impairment of the rights of the protestants as a matter of law."[109] *Mathers* seems to say that the very administrative fixing of a life to an aquifer takes away the rights of seniors to a cause of action against juniors for general impairment of the

104. 513 P.2d 627 (1973).
105. *Id.* at 632.
106. 421 P.2d 771 (1966).
107. *Id* at 774.
108. *Id.* at 775.
109. *Id.* at 776.

aquifer.[110]

How these two cases relate to a possible case in Kansas may depend on the answers to four questions: (1) whether the groundwater aquifers in Kansas are treated as one aquifer or as several with differing characteristics; (2) whether the aquifer, or aquifers, are rechargeable or nonrechargeable, or as described in *Mathers,* "for all practical purposes" nonrechargeable; (3) whether senior rights obtained prior to the promulgation of safe yield and depletion formulae are in a different and superior legal position to those rights obtained after the promulgation; and (4) whether senior rights in the safe yield GMD's (Big Bend GMD No. 5 and Equus Beds GMD No. 2) are different than those in the depletion GMD's (Southwest Kansas GMD No. 3, Northwest Kansas GMD No. 4, and Western Kansas GMD No. 1).

Even were there a possible cause of action for general impairment in Kansas, there seems to be a reluctance on the part of irrigating farmers in general to exert their priorities against other irrigators and to file such suits. In the Walnut Creek IGUCA hearings,[111] this same unanimity of farming interests was apparent in that all the irrigators in the basin banded together to be represented by one set of counsel, despite the fact that the farmers held water rights ranging from vested rights and very senior appropriation rights to very junior water rights.

C. Time for Another Study?

Several studies on Kansas water resources and groundwater irrigation over the last fifty years show an evolution of views, conclusions, and recommendations. An economic study conducted by the KU School of Business in 1955[112] foresaw an upward trend in groundwater irrigation in Southwest Kansas[113] and seemed to promote the idea of greater groundwater irrigation in that region as a way of stabilizing production and income.[114] But

110. "Obviously, mining in a sense of sustained overdraft of a basin or subbasin can render the means of diversion of existing wells inadequate. A state's decision to allow mining in that sense, even on a controlled basis, implies that existing diversion methods will not be protected against water level decline in a well due to mining." George Gould et. al., CASES AND MATERIALS ON WATER LAW 377 (7th Ed., Thomson/West) (2005) (discussing *Mathers*).

111. *See supra* Section III.B.1.

112. Pfister, *supra* note 77. The report first noted that "there appears to be adequate water available for the likely requirements other than irrigation," so the major part of the study was "oriented toward the use of water for irrigation." *Id.* at 2. It stated that one of the causes of agricultural instability in the Great Plains is the variability of precipitation, and thus sought to describe the "potentialities of irrigation." *Id.* at 3.

113. *Id.* at 100. ("An upward trend in acreage irrigated seems definitely established on the basis of statistics available.").

114. In the Introduction, the report stated that "[t]he goal of an irrigation program is, of course, to increase or to stabilize production and income." *Id.* at 3. It observed that for dry-land farmers crop yields were highly uncertain, but that while irrigation would not "by any means eliminate fluctuations in income and production," it "may prevent drops to disastrously low levels during prolonged drought periods." *Id.* at 98-99.

following the great increase in irrigation permits in the 1960s and 1970s, the legislature began to focus on management instead of development: it stated in the failed 1968 GMD Act and again in the successful 1972 Act that two of the goals of managing groundwater were to "stabiliz[e] . . . agriculture . . . and prevent . . . economic deterioration."[115]A Governor's Task Force on Water Resources in 1977 contained a section on "The Economic Problem" including some cost-benefit analyses.[116] It stressed, for example, the need for more efficiency in irrigation to increase the life of the aquifer. Importantly, it concluded that a 10% reduction in water use "would extend the aquifer's life by two years during the next 25 years . . . [meaning] . . . that an additional one billion dollars can be generated from the same volume of water in a 25-year period."[117] It also stated that GMD's "need to have additional financial resources in order to carry on adequate management programs," and that "[t]he basic need in western Kansas is to prolong the life of the Ogallala and other aquifers . . . ."[118]

A federally sponsored study concluded in 1982 that "the quantities of ground water that are withdrawn and used far exceed the quantities being replaced" which will result in "severe economic consequences at the local, regional, and national levels."[119] That report contained eighteen specific recommendations, many of which involved increases in funding at all levels of government. The final recommendation was to assist on-going programs "to help diversify the economy. . . to develop less water-intensive enterprises and to improve the economic viability of dryland farming, ranching and nonagricultural opportunities."[120] This latter recommendation of diversifying the economy comports with suggestions made by economic experts at the international level, who essentially suggest that we face up to the inherent limitations in traditional management responses to groundwater problems, and begin to use more adaptive approaches, including diversification into non-agricultural activities.[121] In short, what had started in Kansas as recommendations to increase irrigation to stabilize economies in the 1950's changed to recommendations in the 1970s to slow it down by increasing funding and figuring out how to cut back on groundwater irrigation, and finally to seek other approaches and economies to replace irrigated agriculture

115. KAN. STAT. ANN. § 82a-1020 (1997). *See supra* Section IV.A.

116. INTERIM REPORT OF THE GOVERNOR'S TASK FORCE ON WATER RESOURCES 83 at 50-53 (Interim Report) (1977).

117. *Id.* at 52.

118. *Id.* at 65. The Report also contained numerous other recommendations, many of which were later implemented.

119. A SUMMARY OF RESULTS OF THE OGALLALA AQUIFER REGIONAL STUDY, WITH RECOMMENDATIONS TO THE SECRETARY OF COMMERCE AND CONGRESS 4, High Plains Study Council, Econ. Dev. Admin.(1982).

120. *Id.* at 56 (Recommendation G-1).

121. *See, e.g.*, Marcus Moench, *When the Well Runs Dry but Livelihoods Continue: Adaptive Responses to Groundwater Depletion and Strategies for Mitigating the Associated Impacts* (to be published as a chapter in upcoming book by the International Water Management Institute (IWMI), Colombo, Sri Lanka) (on file with author).

when the well runs dry.

A common-sense analysis of groundwater management would naturally engender twin questions: What have we spent? Has it been worth it? GMD's have spent over $25,000,000 since their inception.[122] Figures for the share of DWR's budget spent on groundwater management versus other responsibilities are probably neither readily available nor easily calculable. A cost-benefit analysis is beyond the scope of this paper, but might help answer the questions of what GMD and DWR expenditures have purchased, how the GMD concept has benefited the local area, region, state, and nation, and what other direct and indirect costs and benefits are relevant.[123] Despite the studies mentioned above, it seems prudent to suggest the potential value of a new cost-benefit analysis of this complex problem of groundwater management in Kansas by economists and policy makers. Such an analysis should consider tangible and intangible costs and benefits,[124] direct and indirect costs and benefits, and economic and environmental costs and benefits, as they affect both the public and the private sectors. The analysis could study what has been done, and what should be done in the future. The conclusion might be to recommend even more money be spent to manage groundwater, or it could draw the opposite conclusion.

V. CONCLUSION

This paper has not answered the question of whether groundwater management has worked in Kansas. But, here are some observations: GMD's have provided a local stakeholder perspective, although somewhat narrow, to the state groundwater control problem. GMD's have provided staff to examine applications and make recommendations to the chief engineer about permit approval and other issues, thus relieving the Chief Engineer's office of performing and funding these functions. GMD's have aided DWR in establishing regulations on safe yield and depletion, which have helped to slow the rate of mining the aquifer. They have sought and received closures of

122. Information received via e-mail inquiry of each of the five GMD's, February 27, 2006 (on file with author).

123. *See generally.* Ronald Griffin, WATER RESOURCE ECONOMICS: THE ANALYSIS OF SCARCITY, POLICIES, AND PROJECTS (2006).

124. "While it is essential to recognize the role groundwater plays as a basis for socio-economic development, it is equally important to recognize that all uses produce inherent externalities, or have negative impacts upon the resource base." GROUNDWATER AND SOCIETY, *supra* note 56, at 22. "Water-level declines and groundwater overdraught can lead to a wide array of social, economic and environmental consequences, including: Critical changes in patterns of groundwater flow to and from adjacent aquifer systems; declines in stream base flows, wetlands etc. with consequent damage to ecosystems and downstream users; increased pumping costs and energy usage; land subsidence and damage to surface infrastructure; reduction in access to water for drinking, irragition and other uses, particularly for the poor; increases in the vulnerability of agriculture (and by implication, food security) and other uses to climate change or natural climatic fluctuations as the economically accessible buffer stock of groundwater declines." *Id.* at 56.

much of Southwest Kansas to new permits. Some GMD's have participated in DWR's establishment of IGUCA's. Since their inception, GMD's have been active and involved with the numerous efforts described and not described above. Many of these may have occurred anyway, by DWR action alone, but which ones would have occurred would be impossible to surmise. Had the GMD concept not been established, had DWR continued granting appropriation permits at the same rate as in the 1950's through the 1970's without either depletion or safe yield formulae, groundwater mining would have been occurring at an even faster rate. GMD and DWR depletion and safe yield policies and regulations have prevented numerous applicants from obtaining water rights, thus costing them and local businesses potential economic gain, at least in the short run. Yet having even stricter policies would have preserved even more of the aquifer for future use. The strict regulations have likely saved some of the riparian vegetation, and yet even stricter regulations would have saved even more. Strict regulations on changes of water rights make it difficult and expensive for water right holders to consummate sales to others or to make changes in their own operations, often entailing hiring of lawyers and hydrologists.

In short, groundwater management in Kansas has fostered conservation and slowed down the depletion of the aquifer. The question is whether the restrictions could or should have been more strict such that there might have been more water left in the aquifers. That question cannot be answered under current Kansas law, because we do not have cases that draw the line where lawful restrictions on pumping stop and unlawful takings begin, or a case on whether general aquifer depletion by junior water right holders in the region is actionable. Those cases may yet come. But an economic, cost-benefit study at this juncture might suggest where we stand and where we might go from here.