High Noon on the Ogallala Aquifer: Agriculture Does Not Live by Farmland Preservation Alone

Part 1

by

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> Each generation has the usufruct of earth during the period of its continuance. When it ceases to exist, the usufruct passes on to the succeeding generation, free and unencumbered, and so on, successively, from one generation to another forever. We may consider each generation as a distinct nation, with a right, by the will of its majority, to bind themselves, but none to bind the succeeding generation, more than the inhabitants of another country.[1]
>
> Thomas Jefferson

I. INTRODUCTION

Considerable attention has focused recently on efforts to protect American farmland from the tide of development that each year converts nearly 3,000,000 acres[2]—about one-third of it prime land[3]—to nonagricultural uses. No one suggests that the United States is running out of farmland, but the 1981 *Final Report* of the National Agricultural Lands Study (NALS),[4] a federal interagency study group established to examine all aspects of the problem, characterizes the large-scale conversion as "cause for serious concern."[5]

NALS is primarily concerned with our ability to meet production needs. The study group estimates that in order to meet the demand for United States agricultural products over the next twenty years,[6] approximately 100,000,000 additional acres in principal crops will need to be planted.[7] However, use of additional acreage for cropland will involve higher production costs because the quality of land required will not be as high as that currently in production. The additional land will also be

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1. Letter from Thomas Jefferson to John Wayles Eppes (June 24, 1813), *reprinted in* THOMAS JEFFERSON WRITINGS 1280-86 (Library of America 1984)[hereinafter Letter].

2. NATIONAL AGRIC. LANDS STUDY (*NALS*), FINAL REPORT 35 (1981)[hereinafter FINAL REPORT]. The figure included 675,000 acres of cropland, 537,000 acres of range and pastureland, 825,000 acres of forestland and 875,000 acres of "other" land uses. *Id.*

3. Keene, *Agricultural Land Preservation: Legal and Constitutional Issues*, 15 GONZ. L. REV. 621, 621 (1980).

> [Prime farmland] is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but no urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods.

7 C.F.R. § 657.5(a)(1986).

4. FINAL REPORT, *supra* note 2.

5. *Id.* at 85. While perhaps the most comprehensive, the *Final Report* is only one of a number of studies reaching essentially the same conclusion. *See, e.g.*, SENATE COMM. ON AGRIC. NUTRITION AND FORESTRY, 97TH CONG., 1ST SESS., AGRICULTURAL LAND AVAILABILITY: PAPERS ON THE SUPPLY AND DEMAND FOR AGRICULTURAL LANDS IN THE UNITED STATES (Comm. Print 1981); *Preserving America's Farmland—A Goal The Federal Government Should Support* (REPORT TO THE CONGRESS BY THE COMPTROLLER GENERAL)(Sept. 20, 1979); W. FLETCHER & C. LITTLE, THE AMERICAN CROPLAND CRISIS (1982); R. DIDERIKSEN, A. HIDLEBAUGH & K. SCHMUDE, POTENTIAL CROPLAND STUDY (USDASCS Statistical Bulletin No. 578, 1977).

6. FINAL REPORT, *supra* note 2, at 55. Since the high and low figures reflect more extreme conditions, the "most probable" midrange figure is 72.7%. *Id.*

7. *Id.* at 59. The midrange figure is 95,000,000. The high and low estimates assume, respectively, 0.75% and 1.5% annual gains in crop yield; the midrange estimate assumes a 1.25% gain. Constant real prices are assumed. *Id.*

more susceptible to crop failure and to yield and quality variability.[8] Therefore, NALS concludes that production requirements can be met only if the rate of conversion is decreased. Growth need not stop, but must be "channel[ed] . . . onto less productive agricultural land."[9]

Numerous local, state and national programs have been devised to preserve farmland.[10] By definition, these programs focus primarily on the urban fringe where most development occurs. Cities have not been asked to stop growth, which they view as a positive force, but to integrate farmland preservation goals into growth management programs. Inevitably then, farmland protection programs serve dual purposes—the preservation of agricultural land and the control of urban sprawl. The most effective of these programs have succeeded by coupling limited land use controls with offsetting benefits—such as reduced property taxes, freedom from antifarm regulation, or compensation for the sale of development rights—that respond to the needs of the small farmer.[11]

However, the availability of land does not by itself ensure the continuation of farming. Some states, therefore, have devised even more farsighted programs to preserve not just farmland but to protect agriculture itself; these programs treat the facilitation of growth and the support of agriculture as coequal values.[12] For example, after making provisions for reasonable urban growth, the Oregon Land Use Planning Act, the nation's most comprehensive land use scheme, declares that "farmland shall not be developed except in a manner consistent with the long-term [commercial] viability of agriculture."[13] Whatever the level of sophistication, however, these programs share a common denominator: they treat the protection of agricultural land, even the protection of agriculture itself, as a land use issue.

I applaud the successes of these programs, but I believe their focus, and the focus of the agricultural lands debate in general, is far too narrow. While the disappearance of farmland is the most visible problem, conserving only the surface of the land will not ensure the continuation of viable agriculture; land is not the only natural resource required for the production of food. Land that is losing its topsoil to erosion,[14] rely-

8. *Id.* at 61; *see* Duncan, *Toward a Theory of Broad-based Planning for the Preservation of Agricultural Land*, 24 NAT. RESOURCES J. 61, 67 (1984).

9. FINAL REPORT, *supra* note 2, at 18.

10. For an in-depth discussion of a number of such programs, see Duncan, *Agriculture as a Resource: Statewide Land Use Programs for the Preservation of Farmland*, 14 ECOLOGY L.Q. 401 (1987)[hereinafter *Agriculture as a Resource*]; Duncan, *supra* note 8.

11. *See generally* Duncan, *supra* note 8.

12. *See generally Agriculture as a Resource*, *supra* note 10.

13. *Id.*

14. Soil erosion is a major problem in the United States. One out of every eight acres of cropland, more than 50,000,000 acres, has an erosion rate at least double that which the soil can tolerate without damage to its productive capacity. H.R. REP. NO. 271(I), 99th Cong., 1st Sess. 81, *reprinted in* 1985 U.S. CODE CONG. & ADMIN. NEWS 1185. A 1977 survey of the 413,000,000 acres of land designated as cropland revealed that the lands lost an average of 2,000,000,000 tons of soil a

ing on polluted water supplies,[15] or lacking an adequate water supply is as incapable of growing crops as land that has been converted to a nonagricultural use.[16] Furthermore, in nonurban fringe areas like the Farm Belt, an area critically important to American agriculture, the land supply is not threatened. In that region one normally sees nothing but farmland from horizon to horizon, and urbanization problems exist only in pockets. Yet much of the area is prone to erosion, and much of it is semiarid—supporting cultivation only by means of large-scale irrigation. As a microcosm, the region demonstrates the universal principle that conservation of natural resources other than land is just as critical to the long-term viability of American agriculture as the preservation of farmland.[17] The general purpose of this Article is thus to expand the current

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year. (A four inch layer of topsoil weighs about 650 tons per acre.) Sampson, *The Ethical Dimension of Farmland Protection*, in FARMLAND FOOD AND THE FUTURE 89, 91 (M. Schepf ed. 1979). A more recent USDA study estimates that if current levels of erosion continue for the next 50 years on the 290,000,000 acres studied, losses will be equivalent to withdrawing from production 23,000,000 acres, enough land to have produced about half of 1980 United States grain exports. Wadley, *Farmland Preservation And Soil Conservation: A Social Function View of the Problem*, 1 FLA. INT'L L.J. 155, 157 (1986). On the Great Plains, losses from wind erosion over the next 50 years could equal 62,000,000 acres—enough land to have produced virtually all 1980 exports. *Id.* Congress has recently responded to the problem by enacting major new soil conservation programs, and at least one state has passed legislation that permits the imposition of soil loss limits. IOWA CODE ANN. § 467A.44 (West 1971 & Supp. 1987); *see* Woodbury County Soil Conservation Dist. v. Ortner, 279 N.W.2d 276 (Iowa 1979). For a discussion of *Woodbury*, see *infra* note 365. For a discussion of new congressional soil conservation programs, see *infra* note 287.

15. Providing water that is safe for human consumption has been one of the primary objectives of water pollution legislation. *See, e.g.*, Safe Drinking Water Act, 42 U.S.C. § 300f to 300j-10 (1982). The Act was recently amended to create a national program to protect aquifers. Safe Drinking Water Act Amendments of 1986, Pub. L. No. 99-339, 100 Stat. 642. But there has been relatively little attention paid to the impact of water pollution on agriculture.

Yet water needed for irrigation can be rendered unusable in a number of ways. In addition to the obvious sources of pollution such as toxic waste dumps or the release of effluents into streams, which also threaten drinking water, agricultural water can also be contaminated by salt or salt water. Salt, for example, can escape from salt mining operations. *See* Miller v. Cudahy Co., 592 F. Supp. 976 (D. Kan. 1984)(allowing salt to pollute freshwater used for agricultural purposes constitutes a nuisance). Salt water can spread from improperly cased or capped oil and gas wells. Marshall, *Water Quality*, in M. FUND, WATER IN KANSAS: A PRIMER 37 (Kansas Rural Center 1984). Salt water pollution can also occur as a function of the overpumping of freshwater aquifers; as the head of the freshwater aquifer is reduced, it may be contaminated by adjacent brackish aquifers. R. BALSTERS & C. ANDERSON, KANSAS WATER RESOURCES BOARD, WATER QUALITY EFFECTS ASSOCIATED WITH IRRIGATION IN KANSAS 15 (1979). Agricultural states with oil and gas industries often have special regulations aimed at protecting freshwater from salt water pollution. *E.g.*, KAN. STAT. ANN. §§ 55-121 to -185; 55-901 to -904; 55-1003 to -1004 (1983 & Supp. 1986); OKLA. STAT. ANN. tit. 52, §§ 296, 309-320 (West 1969 & Supp. 1987).

16. *See generally* Wadley, *Farmland Preservation And The Right to Farm: A Serious Land Use Problem From A Different Viewpoint*, in ESSAYS ON LAND AND NATURAL RESOURCES LAW: ISSUES IN AMERICAN AGRICULTURAL LAW (L. Vinion, ed.)(to be published by Greenwood Press, 1987).

17. Professor James Wadley suggests that in order to be meaningful, the farmland debate must also confront a panoply of larger social issues. These include basic distinctions between rural and urban points of view and the fundamental conflict between the sanctity of individual ownership and the necessity for public control. *Id.* I agree and believe that, perhaps most strikingly, the farmland debate has failed to consider the structure of American agriculture.

Most farmland protection programs are aimed at preserving small farms, yet preservationists have not made the case for their protection. Certainly, the movement's *raison d'etre*—the protection of production capacity—cannot serve as a rationale; small farms currently account for only a tiny percentage of United States farm output. *See* Duncan, *supra* note 8, at 70-71. *Contra Family Farm Entry Assistance Act: Hearings on S. 582 Before the Subcomm. on Agricultural Credit and Rural Electrification of the Senate Comm. on Agriculture, Nutrition and Forestry*, 96th Cong., 1st Sess. 48

farmland debate beyond urban fringe, land use issues.

This purpose could be accomplished by examining the availability of any important agriculturally related resource, but for two reasons I have chosen to focus on water, in particular those portions of the giant Ogallala Aquifer underlying western Kansas. First, the history of irrigation in western Kansas, sketched below, which is typical for the Ogallala region, demonstrates the difference the presence or absence of a single resource may have on agriculture. The aquifer thus exemplifies the proposition that viable agriculture requires natural resources in addition to land. Second, in attempting to broaden the debate to encompass nonurban fringe areas, it seems fitting to turn to one of the nation's least urban and most agricultural regions, the High Plains.[18] In vast stretches of that area, water is in short supply, and the depletion of the giant Ogallala Aquifer, which underlies parts of eight states[19] (figs. I and II), is the most serious water problem. Since well-reasoned water policies are critical to the continuation of dependable agriculture in the region, the specific purpose of this Article is to examine the nature of the water shortage and to suggest new ways of tackling it.

Because water law, a division of the law of property, is established by individual states,[20] concentration on the policies of a particular state

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(1979)(statement by Sen. Gaylord Nelson that family farms help ensure constant food supplies by providing flexibility to the agricultural structure). Still, their existence is and will continue to be essential to local economies and to a way of life that fosters a holistic land ethic on which our long-term ability to produce ultimately depends. *See generally* W. BERRY, THE UNSETTING OF AMERICA: CULTURE & AGRICULTURE (1977). In short, small farms are vital to our agricultural well-being, regardless of their level of production.

These cultural and sociological issues, which are also raised by the current farm credit crisis, cannot be dealt with adequately in an article devoted to water issues, but I believe we must also extend the farmland debate to encompass them. We must face the reality that the long-term viability of American agriculture depends not only upon the preservation of agricultural resources, but also upon their broad-based distribution. For an excellent discussion of the topic, see U.S. DEP'T AGRIC., A TIME TO CHOOSE: SUMMARY REPORT ON THE STRUCTURE OF AGRICULTURE (1981).

18. The area underlying the Ogallala Aquifer contains six percent of the nation's land area but is home to only one percent of the population; it produces 15% of the country's total value of wheat, corn, sorghum and cotton, and 38% of the total value of livestock. HIGH PLAINS STUDY COUNCIL, A SUMMARY OF RESULTS OF THE OGALLALA AQUIFER REGIONAL STUDY, WITH RECOMMENDATIONS TO THE SECRETARY OF COMMERCE AND CONGRESS 1 (1982)[hereinafter SUMMARY].

19. Estimates of the aquifer's size vary from 225,000 square miles, M. FUND & E. CLEMENT, DISTRIBUTION OF LAND AND WATER OWNERSHIP IN SOUTHWEST KANSAS 2 (Kansas Rural Center 1982), to three times the area of the State of New York, Note, *The Overlooked Farm Crisis: Our Rapidly Depleting Water Supply*, 61 NOTRE DAME L. REV. 454, 456 (1986). The aquifer underlies portions of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas and Wyoming, and except for the valley of the Smoky Hill River, it underlies the entire western one-third of Kansas.

20. "[E]ach state has full jurisdiction over the lands within its borders, including the beds of streams and other waters." Kansas v. Colorado, 206 U.S. 46, 93 (1907). *But cf.* Sporhase v. Nebraska *ex rel.* Douglas, 458 U.S. 941 (1982). In the latter case the Court held the waters of the Ogallala to be an article of commerce, declaring that to hold otherwise would be to restrict the power of Congress to regulate groundwater overdraft, which the Court sees as a national problem:

> [S]tudies indicate that over 80% of our water supplies is used for agricultural purposes. The agricultural markets supplied by irrigated farms are worldwide. They provide the archetypical example of commerce among the several States for which the Framers of our Constitution intended to authorize federal regulation. The multistate character of the Ogallala aquifer—underlying appellants' tracts of land in Colorado and Nebraska as well

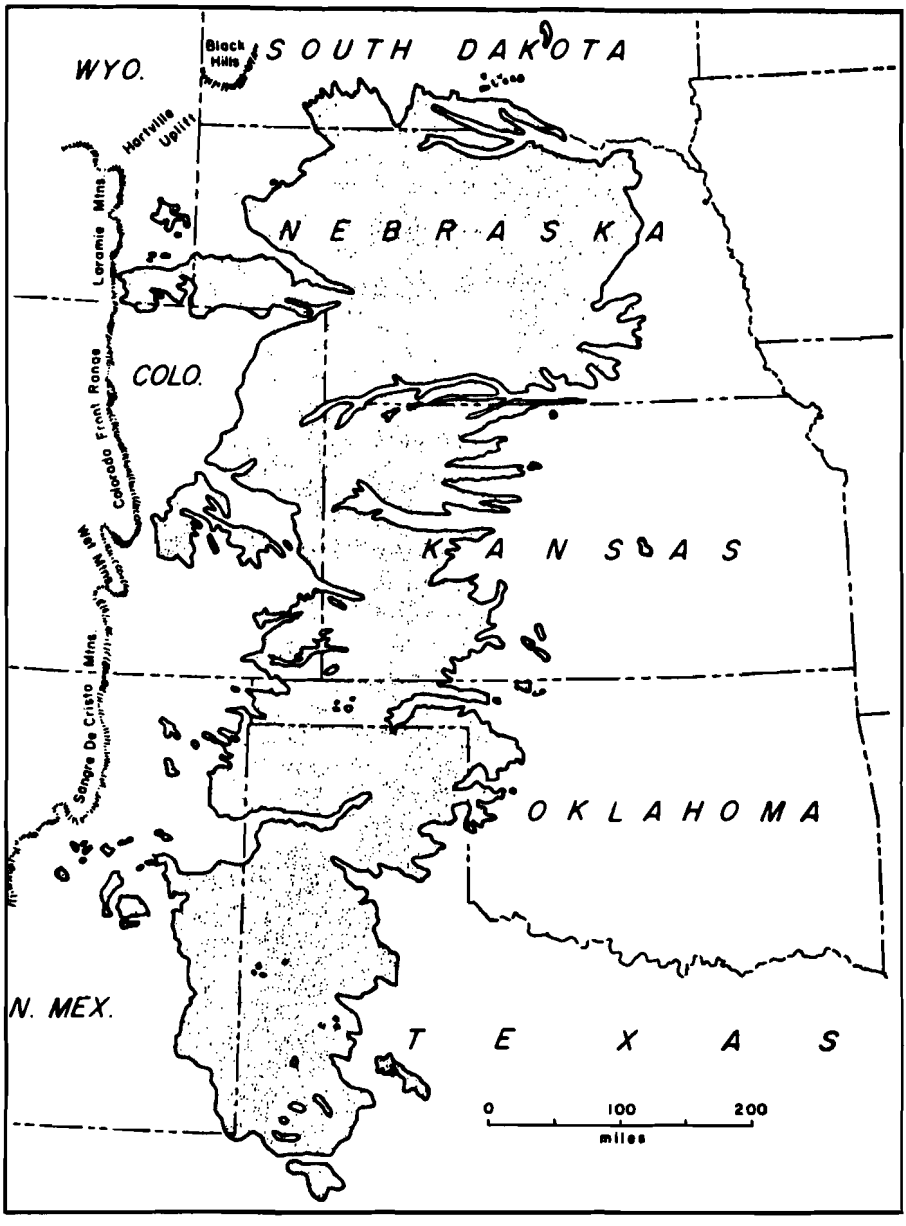
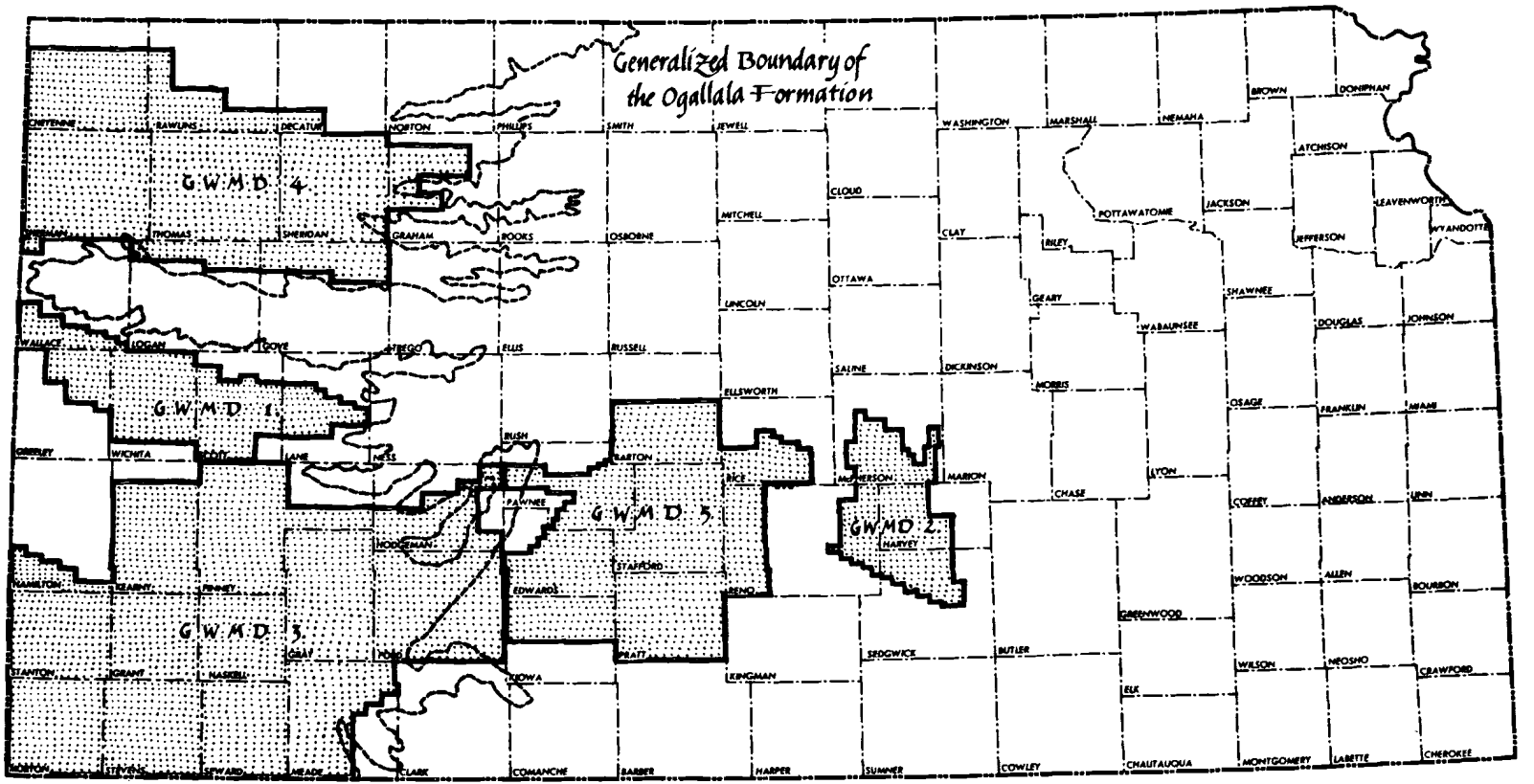


Figure I — The Ogallala Aquifer

Source: Kansas Geological Survey, Bulletin 162 (1963).



Groundwater Management Districts in Kansas

Figure II

Source: Interim Report of the Governor's Task Force on Water Resources 51 (1977).

will provide the most meaningful discussion. I have chosen Kansas as the prototype. However, since the problems in Kansas are typical, I believe this analysis will also assist other High Plains States in formulating a water policy.[21]

Part II of the Article will describe the crisis on the Ogallala Aquifer, and part III will argue for the adoption of a water conservation ethic founded on concepts of stewardship and justice between generations. Part IV will describe how the current prodevelopment structure of Kansas groundwater discourages conservation. Part V, by focusing on forgotten conservation-oriented provisions in the statutes, will offer a reinterpretation of the law that can serve as the basis for the implementation of a conservation ethic.

II. THE CRISIS ON THE OGALLALA

The Ogallala Aquifer epitomizes the difference the presence or absence of a single resource may have on the environment, and by extension, on agriculture. Prior to the aquifer's discovery, in the days when the Santa Fe Trail crossed southwestern Kansas, the trek between the Arkansas and Cimarron Rivers was feared as the *Jornado del Muerto*—the journey of death—because water was virtually nonexistent.[22] Similarly, early settlers discovered that west of the 100th meridian, which passes through Dodge City, Kansas, the level of natural precipitation was so sparse and erratic that it could not consistently be relied upon for the cultivation of crops.[23] By contrast, today's visitor to the Sandsage

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as parts of Texas, New Mexico, Oklahoma, and Kansas—confirms the view that there is a significant federal interest in conservation as well as in fair allocation of this diminishing resource.

> The Western States' interests, and their asserted superior competence, in conserving and preserving scarce water resources are not irrelevant in the Commerce Clause inquiry. Nor is appellee's claim to public ownership without significance. Like Congress' deference to state water law . . . these factors inform the determination whether the burdens on commerce imposed by state ground water regulation are reasonable or unreasonable. But appellee's claim that Nebraska ground water is not an article of commerce goes too far: it would not only exempt Nebraska ground water regulation from burden-on-commerce analysis, it would also curtail the affirmative power of Congress to implement its own policies concerning such regulation. If Congress chooses to legislate in this area under its commerce power, its regulation need not be more limited in Nebraska than in Texas and States with similar property laws. Ground water overdraft is a national problem and Congress has the power to deal with it on that scale.

Id. at 953-54 (citations omitted).

The Court's statements seem more legislative than judicial, and conflict with *Kansas v. Colorado*, which the Court fails to cite. Moreover, because *Sporhase* dealt with a state's power to regulate the interstate transfer of water, pronouncements about congressional power to enact conservation legislation are arguably dictum and certainly premature. *Id.* at 962 (Rehnquist, J., dissenting). There are measures the federal government could take to help the overdraft problem, but they do not involve direct regulation of water rights. *See infra* note 287.

21. Nebraska, for example, must decide how extensively to develop the aquifer; in 1977, 77% of the aquifer's available water was within its boundaries. Massey & Sloggett, *Managing Groundwater in the Ogallala Aquifer for Irrigation*, 9 OKLA. CITY U.L. REV. 379, 381 (1984).

22. J. GREGG, THE COMMERCE OF THE PRAIRIES 59 (1967)(1st ed. 1844).

23. The 100th meridian is generally considered the dividing line between humid and semiarid to arid climates. 1 W. HUTCHINS, WATER RIGHTS LAWS IN THE NINETEEN WESTERN STATES 1-2

Prairie, south of the now dry bed of the Arkansas River, observes huge center pivot sprinkling systems irrigating entire quarter sections. These systems permit local farmers to produce crops of corn, a high water use crop,[24] routinely yielding over 100 bushels an acre.[25] The difference is due entirely to water from the Ogallala Aquifer.[26]

The extent of water development in western Kansas, and on the Ogallala in general, is in large part a function of a number of conditions which occurred in the 1960s and 1970s.[27] Early irrigators used flood or gravity systems which carried water in trenches between crop rows. Because these systems were subject to erosion, weed growth and rodent damage, their maintenance involved considerable manpower; they also required land that either naturally sloped or was artificially prepared to slope, very gently from one end of the field to the other. The latter requirement remained even after the invention of moveable irrigation pipe, and of course, the movement of pipe still entailed heavy manual labor.

It was the invention of the center pivot system in 1952 that revolutionized irrigated agriculture.[28] The device eliminated most of the need for hand labor; more significantly, it allowed the irrigation of rolling or hilly land, such as the Sandsage Prairie south of the Arkansas River in Finney County, Kansas (fig. III), and the Nebraska Sandhills.[29] Center pivot systems pump water through sprinkler pipe supported by wheeled

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(1972); 1 WATERS AND WATER RIGHTS 30, 79-80 (R. Clark ed. 1967). In western Kansas precipitation averages about 20 inches per year, but in the driest years can be as low as 10 inches and in the wettest as high as 30 inches. It is this unpredictability that causes dryland agriculture in the area to be such a risky endeavor. M. FUND, *supra* note 15, at 2.

24. Irrigating 160 acres of corn in western Kansas requires approximately 240 acre feet of water per year in addition to annual rainfall; that amount equals about 78,000,000 gallons, enough water to meet the daily needs of a city nearly twice the size of Wichita. (An acre foot is the amount of water needed to cover one acre a foot deep in water, approximately 325,872 gallons.) Only alfalfa and sugar beets require more moisture. M. FUND, *supra* note 15, at 30.

25. In 1983, in the 14 counties of southwest Kansas, 273,500 acres of corn yielded 34.7 million bushels, an average yield of 127.1 bushels per acre. All 14 counties produced an average of over 110 bushels per acre; one produced 141.0. KANSAS STATE BD. OF AGRIC., THE 67TH BIENNIAL REPORT AND FARM FACTS 148 (1985). The same counties also produced 1.6 million acres of wheat (average yield 44.8 bushels per acre); 683,000 acres of milo (average yield 48.2 bushels per acre); and marketed 1.4 million head of grain fed cattle. *Id.* at 120, 132, 204. In 1984, in the same counties, 313,000 acres of corn produced 43.2 million bushels, an average yield of 161.9 bushels per acre. All 14 counties produced an average of over 130 bushels per acre; five produced 160.0 bushels per acre or more, including one which yielded 178.4 bushels per acre. *Id.* at 150. The same counties also produced 1.9 million acres of wheat (average yield 37.6 bushels per acre) and 915,000 acres of milo (average yield 63.8 bushels per acre). *Id.* at 122, 134.

26. In 1983, only 2500 acres of dryland corn were harvested in the 14 counties of southwest Kansas (average yield 33.0 bushels per acre); in 1984, only 600 acres of dryland corn were harvested (average yield 38.8 bushels per acre). *Id.* at 152, 154.

27. *See generally* M. BITTINGER & E. GREEN, YOU NEVER MISS THE WATER TILL . . . (THE OGALLALA STORY) 24-38 (Water Resources Publications 1980).

28. One commentator has described the center pivot as "perhaps the most significant mechanical innovation in agriculture since the replacement of draft animals by the tractor." Splinter, *Center-Pivot Irrigation*, 234 SCI. AM. 90, 93 (1976).

29. Similarly, a large area of the Colorado Sanddunes, previously considered nonirrigable, began to produce abundant crops of corn after the introduction of center pivots. M. BITTINGER & E. GREEN, *supra* note 27, at 36. On irrigation in Nebraska, see Aiken & Supalla, *Groundwater Mining and Western Water Rights Law: The Nebraska Experience*, 24 S.D.L. REV. 607, 618 (1979).

Figure III — The Surface Features of Kansas
Source: Kansas Geological Survey (1979).

towers about ten feet off the ground and 100-120 feet apart; the entire mechanism can be adjusted for variations in topography[30] and pivots around a well in the center of the field.[31]

Despite the obvious utility of these systems, development was not particularly rapid; in 1965, center pivots irrigated only 1760 acres in Finney County, the heart of the Sandsage Prairie.[32] But in the 1970s the "floating" of the American dollar made the purchase of United States grain more attractive. That condition, combined with the emergence of feed grain as the nation's major agricultural export in the post-World War II period, served as the economic catalyst for increased corn production.[33] The push toward development was accelerated by political rhetoric from the Nixon and Ford administrations that characterized food as a "weapon"[34] and encouraged farmers to plant "fence row to fence row."[35]

Taken together, these factors led to the large-scale "plow up" of previously unbroken land, and to the wholesale expansion of irrigation. By 1974, the number of center pivots in the Sandsage Prairie of Finney County alone had increased to 590, and by 1981, to well over 700.[36] (In Nebraska the number of center pivots rose from 3000 to 17,000 during the period from 1972 to 1978.)[37] Across western Kansas as a whole, the total percentage of acreage devoted to corn production rose from 2.7% in 1957 to 18.3% in 1976.[38] Aquifer-wide, the Ogallala was irrigating over 12,000,000 acres by the mid-1970s, and the production of feed grains had tripled from 129,000,000 bushels in 1954 to 386,000,000 bushels in 1973.[39]

Once begun, large-scale irrigation was difficult to terminate, even when the prices of agricultural commodities fell back to their traditional low levels.[40] Irrigators needing to pay back the huge cost of installing a

30. Topography is not the only factor that previously precluded irrigation in areas such as the Sandsage Prairie. The sandy soils simply dry out so quickly that water does not remain in the root zone long enough to be of much value. Because center pivot systems permit light and frequent watering, they eliminate the problem. M. BITTINGER & E. GREEN, *supra* note 27, at 36.

31. Standard systems are designed for quarter section (160 acre) tracts. The circular pattern leaves out the corners, but special "corner systems" have been developed. *Id.* at 34.

32. M. FUND & E. CLEMENT, *supra* note 19, at 23.

33. Raup, *Competition for Land and the Future of American Agriculture*, in THE FUTURE OF AMERICAN AGRICULTURE AS A STRATEGIC RESOURCE 70 (1980). Similarly, the Soviet Union's purchase of large amounts of wheat, which temporarily boosted prices to almost six dollars per bushel, stimulated expanded production of that crop. D. WORSTER, DUST BOWL: THE SOUTHERN PLAINS IN THE 1930S 233 (1979).

34. W. BERRY, *supra* note 17, at 8.

35. D. WORSTER, *supra* note 33, at 233; *accord* Wadley, *supra* note 16.

36. M. FUND & E. CLEMENT, *supra* note 19, at 23.

37. M. BITTINGER & E. GREEN, *supra* note 27, at 33.

38. Kansas Natural Resource Council, Water Research Data (unpublished)(on file with the author of this Article). Kansas ranks 11th among the states in corn production, and as recently as 1982, 78% of the state's crop was irrigated, three-fourths of which was grown in the western third of the state. M. FUND, *supra* note 15, at 31.

39. M. BITTINGER & E. GREEN, *supra* note 27, at 37.

40. Real prices of farm products have rarely enjoyed long-term upward movement. During the

center pivot system, in excess of $37,000 in 1979,[41] were forced to raise more crops in order to generate the income required to maintain necessary cash flows.[42] Moreover, as the water table subsided, the value of irrigated farmland declined. Consequently, Kansas irrigators pushed for[43] the same tax deduction given Texas and New Mexico Ogallala Aquifer irrigators under a 1965 IRS ruling entitling them to a cost depletion deduction for the exhaustion of their capital investment in groundwater.[44] They were successful in an individual case in 1980,[45] and the ruling was broadened in 1982 to cover the entire aquifer.[46] By permitting deductions worth more than $50,000,000 per year to Kansas farmers alone,[47] government policy not only encourages irrigation on the Ogallala, it also subsidizes it. Thus in a variety of ways, irrigation has beget more irrigation.

The astronomical growth of irrigation has devastated the Ogallala Aquifer. For all practical purposes, the Ogallala is a nonrenewable resource; it receives only one-fourth to one-half inch of recharge from natural precipitation per year.[48] Yet withdrawals in Kansas are estimated to be ten to fourteen times the recharge rate.[49] In effect, the Ogallala Aquifer is being mined. Statistics covering the period from 1940 to 1980 show that in the thirteen southwestern-most Kansas counties, the average drop in the water table has been 38.2 feet, representing a loss of seventeen percent of saturated thickness.[50] Over eighty-three percent of the drop

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period from 1950-80, the trend was downward except for the years 1973-75 when world supply was low. MISSOURI BASIN-GREAT PLAINS CAUCUS, A REPORT ON THE HIGH PLAINS STUDY 4 (1982).

41. K. FREDERICK & J. HANSON, WATER FOR WESTERN AGRICULTURE 160 (1982). Operation is also expensive. From 1970-1980, the real cost of natural gas to lift an acre foot of water 200 feet increased from $2.30 to $9.29; other energy sources, such as electricity and propane gas are considerably more expensive. *Id.* at 145-47. University of Nebraska studies reveal that 43% of the energy used by agriculture is used to pump irrigation water. The studies show the typical center-pivot irrigated farm uses 10 times as much energy to pump water as it uses to till, plant, cultivate and harvest an unirrigated corn crop. Splinter, *supra* note 28, at 93.

42. Wadley, *supra* note 16.

43. M. FUND & E. CLEMENT, *supra* note 19, at 34.

44. Rev. Rul. 65-296, 1965-2 C.B. 181.

45. Gigot v. United States, CA 78-1015 (D. Kan)(case settled with the IRS approving more than $30,000 in refunds); *see also* M. FUND & E. CLEMENT, *supra* note 19, at 34.

46. Rev. Rul. 82-214, 1982-2 C.B. 115.

47. *Southwest Kansas Irrigators Win Tax Break*, Garden City Telegram, Oct. 1, 1980, at 1, *cited in* M. FUND AND E. CLEMENT, *supra* note 19, at 35. When it becomes economically unfeasible to continue irrigation, farmers will be able to claim the full deduction for the remaining deposit in one year. "That's where we'll get into some real big numbers—when the economics render it impossible to irrigate and they're abandoning wells. You're talking as much as $900 an acre rather than [the current] $3 . . . ." *Irrigators Win Tax Break: Depletion Allowance on Water*, Wichita Eagle Beacon, Oct. 1, 1980, *cited in* M. FUND & E. CLEMENT, *supra* note 19, at 35.

48. M. FUND, *supra* note 15, at 19. Furthermore, the deeper the water table, the less the recharge. Thus, as irrigation lowers the water table, recharge becomes even more difficult. *Id.* at 20.

49. STATE OF KAN. INTERIM REPORT OF THE GOVERNOR'S TASK FORCE ON WATER RESOURCES 50 (1977)[hereinafter INTERIM REPORT]. The three Groundwater Management Districts (GMDs) in the Ogallala region use a combined total of 4.5 million acre feet of water per year. M. FUND, *supra* note 15, at 30.

50. ARTHUR D. LITTLE, INC., REPORT TO HIGH PLAINS STUDY COUNCIL, STUDY ELEMENT B-10 ASSESSMENT OF NONAGRICULTURAL DEVELOPMENT POTENTIAL IN THE OGALLALA REGION, at A-6 (1982). The aquifer's depth in Kansas ranges from a few feet to approximately 600

(31.3 feet) has occurred since 1964.[51] In three counties the drop is over fifty feet: Grant (106.0 feet = 32% of saturated thickness), Stanton (72.3 feet = 32%) and Haskell (57.2 feet = 17%). Three other counties have experienced declines of saturated thickness greater than seventeen percent: Kearney (eighteen percent), Finney (twenty-one percent) and Morton (twenty-three percent).[52]

Clearly, various portions of the Ogallala are in trouble. A 1968 study of six southwestern counties projected that if irrigation expanded at the then current growth rate until 1980 and then leveled off, the aquifer would be exhausted by the year 2026.[53] In the same vein, a 1977 report posited that in west central Kansas a continuation of the 1975 withdrawal rate until the year 2000 would leave in place only 800,000 acre feet[54] of water of the 10,000,000 existing in 1975.[55] Finally, the State Water Plan, published in January, 1985, predicts major water deficits in the area overlying the aquifer by the early years of the twenty-first century. The largest shortfalls are projected in the two southwestern planning regions, the state's most heavily irrigated area. In the Cimarron Basin, deficits will total 1.0 million acre feet per year by 2035,[56] and in the Upper Arkansas Basin agricultural shortfalls will begin before the year 2000 and increase to 1.6 million acre feet per year by 2035.[57]

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feet. Thus, statistics showing the decline in saturated thickness are a better index of water use and availability than are those measuring the distance to the water table. INTERIM REPORT, *supra* note 49, at 47-49.

51. ARTHUR D. LITTLE, INC., *supra* note 50, at A-6.

52. *Id.* Data covering the 1950-75 period reveal that relatively small spots in seven western Kansas counties experienced declines of over 50% of saturated thickness. Numerous larger areas experienced declines of 30%-50% and a substantial portion of western Kansas experienced declines of 10%-30%. INTERIM REPORT, *supra* note 49, at 48.

53. D. DARLING, ECONOMIC IMPLICATIONS OF IRRIGATION: A PILOT STUDY 9-10 (Kansas Water Resources Bd. Bulletin No. 9, 1968).

54. An acre foot equals 43,560 cubic feet of water (325,872 gallons), enough to cover one acre of land with one foot of water. See *supra* note 24.

55. INTERIM REPORT, *supra* note 49, at 52.

56. KANSAS WATER OFFICE, KANSAS WATER PLAN, DEVELOPMENT SECTION, SUBSECTION: CIMARRON BASIN 3 (1985).

57. *Id.* SUBSECTION: UPPER ARKANSAS BASIN, at 3. *Contra* KANSAS WATER OFFICE, OGALLALA AQUIFER STUDY IN KANSAS SUMMARY (1982)[hereinafter KANSAS SUMMARY]. The report is the Kansas portion of the High Plains Ogallala Aquifer Regional Study, authorized by Congress to study the aquifer's depletion and to recommend ways of increasing water supplies in the region. Pub. L. No. 94-587, § 193, 90 Stat. 2917, 2943 (1976). In reaching this conclusion, the Kansas report uses the regional study group's baseline scenario that there will be no changes in the law and more efficient technology will be utilized as it becomes available. The report concludes that by the year 2020 water use on the Ogallala will have declined to 75% of the 1977 figure, or from 3.3 million acre feet per year to 0.8 million acre feet per year. The decline will result from a reduction in the number of irrigated acres and increased efficiency. The study's conclusions are questionable because the assumptions underlying the baseline scenario are questionable.

The state study assumes that by the year 2020 the real price of commodities will rise dramatically: 20%, 40% and 50% respectively for wheat, corn, grain sorghum and soybeans. KANSAS SUMMARY, *supra*, at 1. The data parallels the composite regional study which concludes that real prices will increase 28% for wheat, 36% for corn, 33% for grain and 10% for soybeans. SUMMARY, *supra* note 18, at 29. But such increases would be contrary to historical trends since the real prices of farm products have rarely enjoyed long-term upward movement. Indeed, during the period from 1950-80, the trend was downward except for the years 1973-75 when world supply was low. MISSOURI BASIN-GREAT PLAINS CAUCUS, *supra* note 40, at 4.

In fairness it must be pointed out that there is evidence suggesting that the aquifer's rate of depletion has decreased.[58] Moreover, a large number of irrigators have switched to growing less water consumptive crops or to dryland farming.[59] The cost of pumping has simply become too great,[60] a fact exacerbated by the current agricultural debt crisis.[61] Some observers view these recent events as a turnaround,[62] or as a demonstration of the widely expressed view that "simple economics" will cure the aquifer's problem;[63] others see the events as a "pause" and skeptically wonder if concerns about conservation will fade when the farm crisis abates.[64]

Conjecture aside, however, two things are clear. First, as will be discussed later at length, existing prodevelopment policies account for

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The argument that prices will increase is seemingly based on a further assumption, described as "critical to the inquiry," that export demand for United States farm products will also increase significantly. This increase would result from a growing world economy, continued agricultural shortages in some industrialized nations and a United States policy that encourages exports. SUMMARY, *supra* note 18, at 29. But even if this second assumption is correct, the conclusion that irrigation will decrease as exports increase is contrary to historical facts. The Ogallala's accelerated development was due to the Nixon and Ford administration's encouragement to increase production, so that food could be used as an instrument of foreign policy. *See supra* text accompanying notes 34-35. The regional study demonstrates the inadequacy of a resource policy built only on economic models; its authors fail to understand that "a resource policy which is driven by the need to export is a resource-consuming policy . . . [Yet], the whole justification for the High Plains Study is that the Ogallala [A]quifer cannot withstand even present levels of resource use." MISSOURI BASIN-GREAT PLAINS CAUCUS, *supra* note 40, at 7. For further discussion of the inadequacy of the economic model, see *infra* note 72.

In fairness, it must be pointed out that the regional study rejects the baseline scenario as not the most appropriate one; it also recommends that state, federal and private money be made available for research on irrigation efficiency and for conservation demonstration projects. SUMMARY, *supra* note 18, at 31-56. Congress has acted on some of the study group's proposals. *See infra* note 287.

58. According to news accounts, a recent United States Geological Survey reports that the 1984 rate of decline in northwestern Kansas was 0.1 foot, compared to 0.5 foot per year from 1966-83. In west central Kansas, where the rate has been 1.5 feet, the 1984 rate was 0.1 foot. Similarly, in southwest Kansas the rate slowed from 1.5 feet to 0.5 foot. *Rate of drop of water table down in 1984*, Topeka Capital J., Nov. 29, 1985, at 40, col. 1; *see also* Miller, *Fears Ease for a Vital Water Source*, Kansas City Star, June 8, 1986, at 1A, col. 1. It is fair to point out, however, that in 1984 Kansas received more than the normal amount of natural precipitation. Conversation with Mari Peterson, Executive Director of the Kansas Natural Resource Council (Feb. 1985).

59. J. CONVERSE & T.R. HARRIS, THE IMPACT OF INSTITUTIONAL STRUCTURE AND CITIZEN PARTICIPATION ON WATER RESOURCE PLANNING IN WESTERN KANSAS (Kansas Water Resources Research Institute 1982); D. KROMM & S. WHITE, PUBLIC PERCEPTION OF GROUNDWATER DEPLETION IN SOUTHWESTERN KANSAS (Kansas Water Resources Research Institute 1981); Miller, *supra* note 58, at 16A, col. 3.

60. For discussion of irrigation costs, see *supra* note 41. Energy related costs of irrigation have also increased because heavy pumping of the aquifer has lowered the water table; thus, deeper wells are required, thereby increasing the amount of high-priced energy needed to lift the water the extra distance. Nor does it appear that there will be any relief from high energy costs; one study predicts, for example, that the cost of pumping from all energy sources will double by the year 2000, when it will cost $18.58 to lift one acre foot of water 200 feet. K. FREDERICK & J. HANSON, *supra* note 41, at 145-47; *cf.* D. KROMM & S. WHITE, *supra* note 59, at 20 (farmers and agribusiness people believe increasing energy costs will reduce irrigation).

61. Miller, *supra* note 58, at 1A, col. 1, 16A, col. 3.

62. *Id.* at 1A, col. 1.

63. Numerous conversations with individuals concerned about the Ogallala's depletion reveal a wide-spread belief that irrigation will become cost-prohibitive long before the water runs out. *See, e.g.*, Written Testimony to the Division of Water Resources, by Gary Baker, Manager of GMD No. 3 (Nov. 6, 1985)[hereinafter Baker Testimony].

64. Miller, *supra* note 58, at 1A, col. 2.

the large-scale depletion that has occurred on the Ogallala. Thus, in the absence of policy revision, a return to more normal economic times unquestionably could generate a resurgence of high pumping levels leading to the continued depletion and ultimate demise of the aquifer.[65] Even more importantly, the exhaustion of the Ogallala Aquifer would mean the end of irrigated agriculture in western Kansas and a return to the vagaries of dryland farming,[66] an occurrence that would have serious adverse effects on the economy of the region and the state as a whole. Consequently, western Kansas agriculture is at a transition point. I believe the time is ripe for the State of Kansas to ensure that dependable agriculture can be sustained indefinitely. Achieving this result requires the development of long-term water conservation policies that are not vulnerable to problematic, short-term forces.[67]

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65. "It's our point to get in while it's bad and nobody's using the water, and to put in a system . . . to manage it so that when the good times come back, we're not going to go back where we were." Miller, *supra* note 58, at 16A, col. 3-4 (quoting statement by Wayne Bossert, Manager of GMD No. 4). Some observers fear that as farmers fall victim to the agricultural debt crisis, their foreclosed holdings, including water rights, may be sold to more financially stable irrigators who will resume pumping the full amount of water stipulated by the right. Conversation with Mary Fund, Program Coordinator, Kansas Rural Center (Sept. 9, 1986).

66. Other methods of supplying water to the region have been studied but are not considered realistic possibilities. One possibility is transferring water from other parts of the country. For example, the 1982 Ogallala Aquifer regional study, conducted in conjunction with the United States Army Corps of Engineers, concluded that aquifer-wide it would cost $350-$450 per acre foot, excluding distribution costs, to divert water from the Missouri River basin. HIGH PLAINS ASSOC., INC., WATER ELEMENT OF THE SIX-STATE HIGH PLAINS-OGALLALA AQUIFER REGIONAL RESOURCES STUDY 99-100 (1982), *cited in* Note, *supra* note 19, at 458. The Kansas portion of the High Plains study reported the cost in Kansas would be about $300 per acre foot. SUMMARY, *supra* note 18, at VIII.

On water transfers generally, see Peck, *Legal Constraints on Diverting Water from Eastern Kansas to Western Kansas*, 30 U. KAN. L. REV. 159 (1982). On weather modification, see STATE OF KAN., WEATHER MODIFICATION ACTIVITIES IN KANSAS 1972-1977 (Kansas Water Resources Bd. Bulletin No. 22, 1977). On artificial recharge, see STATE OF KAN. ARTIFICIAL RECHARGE EXPERIMENTS NEAR LAKIN, WESTERN KAN. (Kansas Water Resources Bd. Bulletin No. 20, 1977).

67. Although consideration of the issue is beyond the scope of this Article, it is important to note that the effects of a transition to more dryland farming will not be uniform. Because control over land and water is highly concentrated, adjustments will affect small irrigators more severely than larger ones. Thus, since small farms are an essential part of our agricultural base and cultural heritage, I believe Kansas water policy must encompass not only an ethic aimed at conserving the resource itself, but also one that ensures its broad-based allocation. For discussion of the importance of small farms, see *supra* note 17.

A 1982 study by the Kansas Rural Center reveals that in six counties in southwestern Kansas, an average of eight percent of landowners own 55% of the land. M. FUND & E. CLEMENT, *supra* note 19, at 11. In the four of those counties that overlie the Ogallala Aquifer, the same persons or entities own from one-third to two-thirds of irrigated acreage. *Id.* In Finney County, 135 ownership entities, totalling eight percent of landowners, own 47% of the county. Seventy-four of the 135 own 45% of the county's irrigated land, much of which lies in the otherwise nontillable Sandsage Prairie, south of the Arkansas River. *Id.* at 24. Of that group, six control nearly 20% of irrigated land in the county, *id.* at 26, and members of one family, both as individuals and corporate stockholders, control 12% of irrigated land. *Id.* at 33. The six Finney County landowners that each hold in excess of 10,000 acres of agricultural land own a total of nearly 96,000 acres and have 290 water wells registered with the Kansas Division of Water Resources. *Id.* at 27. Similarly, in Nebraska, a 1975 study showed that one-third of irrigated land was owned by investors and nonfamily corporations, about three times as much irrigated land as was held in owner operated family farms. Center For Rural Affairs, From Justice To Equity in Groundwater Policy: A Statement of Social Principles 61, 62 (unpublished manuscript).

It is not surprising, therefore, that a 1981 study of the public perception of the groundwater depletion problem reveals that smaller irrigators are clearly more concerned about the future than

III. THE NORMATIVE FRAMEWORK: A QUESTION OF VALUES

The proposed goal—sustaining long-term dependable agriculture in western Kansas—embodies a fundamental value choice. However, I believe all law is inherently value-laden and that normative judgments cannot be avoided.[68] In planning for its water-related future, the State of Kansas must keep in mind that planning involves "the process of consciously exercising rational control over the development of the physical environment . . . in the light of a common scheme of values, goals and assumptions."[69] The State of Kansas must make a value choice, and I submit, and will seek to demonstrate, that it must be one favoring conservation.

Recognizing that the human race has the ability to seriously damage its natural and cultural heritage on a global scale, Professor Edith Brown Weiss has written that our task is to "develop a normative and procedural framework to ensure that members of the present generation fulfill their responsibility as stewards of this planet to protect future genera-

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larger ones. Forty-two percent of irrigators with five or more wells believed the southwestern Kansas economy will improve in the coming years, while only 20% of those with four or fewer wells felt that way. D. KROMM & S. WHITE, *supra* note 59, at 18-19. The study's authors speculate that a return to dryland farming would be a gradual process for large operations but a rapid one for smaller farmers. Large operators could gradually phase out less productive wells while continuing to pump more productive ones. *Id.*

Not only is such a phase-in impossible for smaller operators, other difficulties may prevent them from returning to dryland farming. They may be so financially overextended, depending on every bushel of grain just to stay in business, that they cannot afford to risk the uncertainties of dryland agriculture. For discussion of irrigation capital costs, see *supra* text accompanying note 42. Moreover, a dryland operation requires about twice as much land as one that is irrigated because of the necessity for summer fallowing a portion of the acreage. M. FUND & E. CLEMENT, *supra* note 19, at 57. Not all irrigators own enough land to make the transition, and many of those who do not are already deeply in debt. Thus, adding debt to buy more land makes no sense even if a lender would finance such a risky endeavor.

It follows that many marginal irrigators may leave farming. What will happen to the water rights they presently control? Simply allowing the market to absorb them, as some observers urge, would further concentrate control over agricultural resources (or lead to the water being withdrawn from agriculture altogether). For discussion of the inadequacy of strictly economic solutions, see *infra* note 72. Thus, just as they are inappropriate means to conserve water, economic solutions alone are an unsuitable means of dealing with resource distribution problems raised by the transition to dryland farming. Because of the importance of small farms, we must instead devise a solution that ensures their continued presence.

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> None who deal with law, however defined, can escape *policy* when policy is defined as the making of important decisions which affect the distribution of values. Even those who still insist that policy is no proper concern of a law school tacitly advocate a policy, unconsciously assuming that the ultimate function of law is to maintain *existing* social institutions in a sort of timeless *status quo*; what they ask is that their policy be smuggled in, without insight or responsibility.

Laswell & McDougal, *Legal Education and Public Policy: Professional Training in the Public Interest*, 52 YALE L.J. 203, 207 (1943).

Those who advocate the continued growth of "big agriculture" are also making a value choice, one that works to the detriment of small farmers. Characterizing the "farm crisis" as a news media myth, former Secretary of Agriculture Earl Butz recently stated that the exodus of small farmers from rural areas was a "[p]art of a process of a growing America . . . and it is not bad. . . . [I]t is the result of a streamlined agricultural industry." Knudson, *Butz blames media for 'farm crisis' image*, Topeka Capital J., June 10, 1986, at 9, col. 5, 6.

69. Williams, *Planning Law and Democratic Living*, 20 LAW & CONTEMPT. PROBS. 317, 317 (1955).

tions."[70] Later in the Article I will discuss specific policy options aimed at the creation of a procedural framework for the conservation of water. But in order for those policy changes to be truly meaningful, indeed politically feasible, they must occur within a new normative framework. We must make a value choice that consciously emphasizes conservation. This choice is dictated by ancient cultural understandings about stewardship[71] and their modern jurisprudential equivalent, the concept of intergenerational justice.

A. *Stewardship*

The choice of a conservation or stewardship ethic represents more than a selection of one value option among many. I believe the choice is ultimately inescapable. Because a stewardship philosophy alone takes into account the limits of nature, it is the only alternative that will ensure the long-term viability of agriculture.[72] Wendell Berry states eloquently

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70. Lecture by Professor Edith Brown Weiss delivered to the International Institute of Human Rights, 16th Study Session, Strasbourg, France (July, 1985), *summarized in* COLLECTION OF LECTURES: TEXTS AND SUMMARIES (1985).

71. Recent commentary suggests that the principle is Biblical. Gibson, *Eco-Justice as a Biblical Theme*, 49 WILDERNESS 52 (Summer 1986). In this country it is probably best exemplified by Amish farmers who, in places such as Lancaster County, Pennsylvania, consistently produce bumper crops.

> Whereas our society tends to conceive of community as a loose political-economic mechanism of mutually competing producers, suppliers, and consumers, the Amish think of 'the community as a whole'—that is, as all of the people, or perhaps, considering the excellence both of their neighborliness and their husbandry, as all the people and their land together. If the community is whole, then it is healthy, at once earthly and holy. The wholeness or health of the community is their standard.

W. BERRY, *supra* note 17, at 212. Similarly, the understanding embodied in the motto of the State of Hawaii, which translates "the life of the land is perpetuated in righteousness," HAW. REV. STAT. § 5-9 (1976), led to that state's 1959 enactment of the nation's first major farmland preservation act. *Agriculture as a Resource, supra* note 10. Jefferson's observation on the doctrine of usufruct, which introduces this Article, also embodies the concept of stewardship.

72. I explicitly reject the economic model which declares that we best fulfill our obligations to future generations by maximizing consumption so that we can pass on accumulated technology and capital investments. H. BARNETT & C. MORSE, SCARCITY AND GROWTH: THE ECONOMICS OF NATURAL RESOURCE AVAILABILITY (1963), *cited in* Weiss, *The Planetary Trust: Conservation and Intergenerational Equity*, 11 ECOLOGY L.Q. 495, 516 (1984). Under that theory, the decision whether to utilize or preserve a resource is made by discounting the value of the preserved resource to later generations into current dollars. If the value of the resource, developed today, can be invested (interest rate = discount rate) to yield a sum greater than its undeveloped value at a designated time in the future, it should be developed. If that sum is less than its undeveloped value, the resource should be preserved in its natural state. Weiss, *supra*, at 517.

This construct is not the panacea its proponents would have us believe. Since it is difficult to establish a truly long-term discount rate, the very act of discounting favors present development. *Id.* at 517-18; *accord* Gjerdingen, *Intergenerational Condemnation*, 21 TULSA L.J. 419, 452-53 (1986). Thus it can be argued that discounting is inappropriate in today's world. In nineteenth century America, an agrarian society endlessly rich in resources, discounting did benefit future generations; the development it generated was the primary method of capital formation. But now that we both realize that resources are finite and view the development of technology as the principal mode of economic development, it is doubtful that resource development based on discount theory will benefit those who follow. *Id.* Finally, discounting does not generate neutral results; capital surpluses generated by development often do not accrue to the nation as a whole but rather to those who already control the resource. *Cf.* D. BROMLEY, *The Benefit-Cost Dilemma*, in WESTERN WATER RESOURCES: COMING PROBLEMS AND THE POLICY ALTERNATIVES 227, 236 (1980)(Symposium sponsored by the Federal Reserve Bank of Kansas City)("Benefit-cost analysis as ordinarily practiced is merely a legitimating device for making a few better off and many others worse off.")

in his profound and provocative book *The Unsettling of America: Culture & Agriculture*:

It is theoretically possible to introduce the needs of future generations into economic analysis that does not rely on discounting. *See* Gjerdingen, *supra* at 448-62 (application of Michelman's and Ackerman's utilitarian "takings" analyses). However, such analysis is rare; too often scholars fail to recognize the shortsightedness of their economic arguments. For example, it is argued that water could be conserved if water rights were severable from the land and freely marketable. *See, e.g.*, J. HIRSHLEIFER, J. DELTAVEN & J. MILLIMAN, WATER SUPPLY, ECONOMICS, TECHNOLOGY AND POLICY 48-51, 239-40 (1969); Oeltjen & Fischer, *Allocation of Rights to Water: Preferences, Priorities and The Role of the Market*, 57 NEB. L. REV. 245 (1978). The argument is that irrigators would be encouraged to use water more efficiently because they could sell their excess. But while individual farmers might conserve water, such an arrangement would not be consistent with long-term conservation; the same amount of water would be used, part of it simply would irrigate someone else's land.

Moreover, the sale of water rights ultimately means they will go to those who control the market place. Because such a policy would enable the large and more financially stable operations to absorb smaller ones, I believe the option is unacceptable. It would further concentrate control over natural resources into the hands of the few who epitomize the development orientation that has created the crisis in the first place. For a discussion of distributional inequities in the control of water, see *supra* note 67. A representative of one major southwestern Kansas irrigator has stated that his company was not particularly concerned with the long-term; it intends to irrigate until the water runs out and then move elsewhere. Conversation with Mary Fund, Program Coordinator, Kansas Rural Center (Aug. 27, 1985). Another large irrigator, the Gigot family, owns over 30,000 acres and 160 wells in Finney County. Gigot operations stretch for nearly 30 miles, from Garden City to Deerfield, and contain 12% of the county's irrigated acreage, nearly all of it used to grow corn. M. FUND & E. CLEMENT, *supra* note 19, at 33. In a 1980 interview, Dean Gigot expressed his frustration with those who suggest irrigators have ignored the limits of nature.

> The same doomsayers are claiming that the buffalo and the Indians should still be here and there should never be any tomorrow. They're time-stoppers. The water is there for man to use, same as the soil, the trees, and the oil. Use it with all the abilities that you have.

Russell, *Ogallala Half Full or Half Empty*, 7 AMICUS J., Fall 1985, at 13, 14; *see also* M. FUND & E. CLEMENT, *supra* note 19, at 33.

I do not advocate that we return to the days of unbroken prairie, but rather that we replace a development philosophy with a conservation philosophy. Moreover, in fairness to the Gigots, it must be noted that they do utilize modern irrigation technology to conserve water. *See id.* at 33. Nevertheless, we should not devise policies encouraging the transfer of water to those who, in all likelihood, would further develop the resource, albeit in an efficient manner.

The open market approach could just as easily result in water being taken out of agriculture altogether. Growing cities need water both for domestic use and for attracting industry. Yet to create a system whereby cities negotiate for water on a case-by-case basis is to surrender control over American agriculture to urban interests. Recent events in Colorado are illustrative. The City of Aurora, a suburb of Denver, is buying Arkansas River water rights from financially pressed farmers in the Rocky Ford area. *See Tapping into a dwindling water supply*, Kansas City Star, Sept. 8, 1985, at 33A, col. 1. Aurora's municipal use of the water will end the water's use for agricultural purposes, seriously impacting one of the West's primary melon and vegetable growing areas. There is also fear the area will suffer an ecological fate similar to that experienced 10 years ago by adjoining Crowley County when Aurora, Colorado Springs and Pueblo bought up water rights. Lacking irrigation water, 20% of all farming in Crowley County ceased. Ominously, "[t]oday the ground where Crowley County farmers used to grow cantaloupe is covered with sagebrush. The wind has blown much of the grassless soil away." *Id.* at 36A, col. 5.

It is true there are no major cities in western Kansas. But as smaller cities attempt to grow, or begin to deplete their water supplies, it is not difficult to imagine a scaled-down version of the same scenario in western Kansas if we permit the open market to be the water allocation device. I, of course, do not mean that cities should not have access to water. Instead, municipal water needs, like those of agriculture, should be planned for; necessary trade-offs should be made as part of an overall policy rather than being left to bidding contests which will be detrimental to agriculture and will inevitably be won by urban interests.

In short, economic analysis alone simply cannot protect water, agriculture, or other natural resources. Noted Kansas botanist and ecologist, Wes Jackson, forcefully states the case for a conservation ethic.

> Few who have seriously thought of the long term future of food in America doubt for a moment that farming as a way of life needs to be promoted, not for the purpose of providing museum pieces for city dwellers, but because we need stewards on the land. Even the town and urban population, in the not too distant future, will have to look to the land reverently, as the source of their sustenance and health. By then it should have be-

> In any of these systems, cultural or agricultural or agricultural or natural, when a species or group exceeds the principle of usufruct,[73] it puts itself in danger. Then, to use an economic metaphor, it is living off the principal rather than the interest. It has broken out of the system of nurture and has become exploitive; it is destroying what gave it life and what it depends upon to live. In all of these systems a fundamental principle must be the protection of the source: the seed, the food species, the soil, the breeding stock, the old and the wise, the keepers of memories, the records.[74]

The truth of these statements should be obvious to Kansans and to the people of the High Plains in general; it is confirmed by their Dust Bowl experience. In the early 1930s the entire country experienced a major drought; from 1932 to 1936 every state except Maine and Vermont experienced a precipitation deficiency of at least fifteen percent of the historical mean.[75] The Southern High Plains, Texas and Oklahoma Panhandles and the counties of southwestern and west central Kansas suffered the most severely. Near Hays, Kansas, on the northwestern fringe of the area, accumulated rainfall deficiency was thirty-four inches—normally two years worth—by 1939.[76]

Yet lack of precipitation did not by itself produce the awesome dust storms which swept across the prairies,[77] nor give rise to the emigration immortalized in Steinbeck's *The Grapes of Wrath*. A six-year drought in the 1890s, at times as severe as that of the 1930s, did not cause the dust to blow. The difference was that in the earlier era most of the grassland had not been broken.[78] But with the increased availability of highly mechanized farm equipment, such as the tractor, the one-way disk plow and the combine, "sodbusting" became the order of the day in the early years of the twentieth century.[79]

Donald Worster describes the plow-up in his insightful book *Dust Bowl*:

> All across the flat open spaces the tractors steadily plowed away, especially in the second half of the 1920s and on up until the very eve of the dust storms. Occasionally they even worked at night, their headlights moving like fireflies in the grass . . . . In thirteen southwest-

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come increasingly clear that stewardship based on economics alone won't do, for if farming continues as a business proposition only, the land is doomed. Eventually short-run economics will dictate the patterns of use.

W. JACKSON, NEW ROOTS FOR AGRICULTURE 109 (1980).

73. For discussion of the concept of usufruct, see *supra* text accompanying note 1 and *infra* text accompanying notes 120-33.

74. W. BERRY, *supra* note 17, at 47. Another commentator declares succinctly: "Agriculture can no more escape certain laws than Newton's apple could ignore the law of gravity." Sampson, *supra* note 14, at 89.

75. D. WORSTER, *supra* note 33, at 11.

76. *Id.* at 12.

77. According to the USDASCS, regional dust storms reduced visibility to less than a mile 14 times in 1932. In succeeding years these storms numbered: 38 in 1933; 22 in 1934; 40 in 1935; 68 in 1936. *Id.* at 15.

78. *Id.* at 84.

79. *Id.* at 89-94.

> ern Kansas counties, where there had been 2 million crop acres in 1925, there were 3 million in 1930. During the same period farmers tore up the native vegetation on 5,260,000 acres in the southern plains—an area nearly seven times as large as the state of Rhode Island .... When the black blizzards began to roll across the plains in 1935, one-third of the Dust Bowl region—33 million acres—lay naked, ungrassed, and vulnerable to the winds.[80]

When the storms ended, the Southern High Plains had suffered enormous physical, social and economic loss. Society's inability or unwillingness to understand fully the place in which it lived, and to work within the natural laws which governed the region, resulted in widespread disaster.[81] Certainly, we learned from our errors and in the years that followed began to pay more attention to techniques of soil conservation. We also enacted legislation and established monuments to remind us of the need to cooperate with nature.

The Bankhead-Jones Farm Tenant Act of 1937[82] directed the Department of Agriculture to develop:

> [A] program of land conservation and land utilization, (including the retirement of lands which are submarginal or not primarily suitable for cultivation) in order thereby to correct maladjustments in land use, and thus assist in controlling soil erosion, and conserving surface and subsurface moisture, and protecting the public lands, health, safety, and welfare.[83]

The Act's message is clear: humankind must develop a sense of place[84] and acknowledge that certain activities simply are inappropriate in cer-

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80. *Id.* at 93-94 (footnote omitted).

81. A 1937 survey of 20 counties by the National Resources Board revealed that 80% of cultivated land and 90% of broken but idle land was seriously eroded; however, serious erosion affected only 20% of pasture land. In order of severity, the three most seriously affected counties were in Kansas: Morton (78.4% of total area seriously eroded), Stevens and Stanton. All were heavily plowed. A. JOEL, SOIL CONSERVATION RECONNAISSANCE SURVEYS OF THE SOUTHERN GREAT PLAINS WIND EROSION AREA 33, 45, 47 (U.S. Dep't Agric. Technical Bulletin No. 556, 1937), *cited in* D. WORSTER, *supra* note 33, at 216-17.

82. Pub. L. No. 75-210, 50 Stat. 522-533 (1937).

83. 7 U.S.C. § 1010 (1982).

84.

> Man's adaptation to nature is never merely a matter of technical understanding and inventiveness. If it were, then the most highly advanced cultures in terms of science and machinery would also be the most well fitted to their environments. In fact, those cultures are among the least well adapted in the world; their prowess encourages a disregard of natural limits more than the qualities of respect and restraint do. Living within the ecological order requires knowledge, of course, and appropriate technology, but more important is the capacity to feel deeply the contours of that order and one's part in it. When both the identity of self and of community become indistinguishable from that of the land and its fabric of life, adaptation follows almost instinctively, like a pronghorn moving through sagebrush. Houses and fields, tools and traditions, grow out of the earth with all the fitness of grass; they belong in their place as surely as any part of nature does. This is genuine adaptation, and it implies much more than shallow managerial skill. It comes from having a sense of place, which is at once a perception of what makes a piece of land function as it does and a feeling of belonging to and sharing in its uniqueness. Because man is a social animal, that sense is a group faculty as well as an individual one—indeed, it is the community that is the principal adaptive unit. The sense of place, therefore, is a complex adaptiveness in which the self reflects the community and the community reflects the natural system, and out of these interdependencies emerges a peculiar cultural ecology.
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> The movement of dust on the southern plains in the thirties argued forcibly that the

tain locations.[85] Thus, since pasture land experienced relatively little erosion in the 1930s as compared to broken land,[86] the Act fittingly served as the catalyst for the establishment of a series of national grassland preserves stretching across the Great Plains; three are in the Dust Bowl area of the Southern High Plains.[87] For example, in Morton and Stevens Counties in Kansas, over 107,000 acres,[88] known as the Cimarron National Grasslands,[89] were reseeded to short grass prairie.

I do not advocate that cultivation in western Kansas cease and the area be returned to short grass prairie used only for grazing. It is not possible to roll back nearly 100 years of history. Nor do I advocate that irrigation from the Ogallala Aquifer immediately be reduced to the level of "safe yield" whereby withdrawal would be limited to the amount of recharge (although such a contention follows logically from the argument that human society must obey nature's rules). Because recharge of the Ogallala is virtually nonexistent,[90] a safe yield policy would effectively end irrigation. As with cultivation, the changes that have accompanied irrigation are of a magnitude that cannot be simply repealed. We must, however, understand that the failure to work within a long-term water conservation ethic could result in ecological and social problems not unlike those of the 1930s.

Soil erosion was the most obvious physical problem that occurred in the Dust Bowl years; when the rain did not come, the soil blew. Unfortunately, large-scale irrigation, which provides guaranteed moisture, has not stopped the wind erosion. In the Great Plains, the prairie region including the High Plains, losses due to wind erosion exceed the generally accepted loss of five tons per acre per year on nearly one-third of wheat land and over one-third of corn land. Losses are even higher on irrigated land, which but for a guaranteed water supply, likely would not be farmed.[91] Some of the largest erosion losses in Kansas are occurring just to the south of the Finney County Sandsage Prairie, in southwest

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people of the region had not achieved that sense of place and the environmental adaption it produces.

D. WORSTER, *supra* note 33, at 191.

85. Will Rogers once remarked:

> We was always taught (I was, I know) that a pioneer, by golly, was a hero. No question, you know? But did you ever think, really, folks, that a pioneer was nothing more than a guy that cut down a tree! And he plowed up land that probably should have been left to grass. You know, that's why we got our problems, down there in the Southwest, in my home. You know, they call it the Dust Bowl now. You see, folks, what we're learning today now is that you can rob from nature just the same way that you can rob from any individual. It ain't just robbin' from nature. It's robbin' from future generations.

Will Rogers' U.S.A. (Columbia recording SG 30546 featuring James Whitmore as Will Rogers), *cited in* W. JACKSON, *supra* note 72, at 15.

86. For discussion of pasture land erosion, see *supra* note 81.

87. D. WORSTER, *supra* note 33, at 264 n.11.

88. Conversation with Jeff Hulse, Cimarron District Ranger (Summer, 1986).

89. 36 C.F.R. § 213.1 (1985).

90. *See supra* text accompanying note 48.

91. MISSOURI BASIN-GREAT PLAINS CAUCUS, *supra* note 40, at 7.

Kansas, along and south of the Cimarron River (fig. III). In that area the average soil loss in 1982 was 17.5 tons per acre, nearly four times the tolerable erosion level set by USDA.[92] Moreover, the situation will only worsen when irrigation ceases and there are no crop root systems to hold the soil. Gary Baker, manager of Groundwater Management District No. 3, knows southwest Kansas intimately. He warns, "[T]he time will come when we'll be real sorry that the Sandsage Prairie was ever developed. I sure don't want to live here when these hills go dry, 'cause they're never going to stop blowing."[93]

Serious as the soil erosion problem is, it is not the only adverse effect of increased irrigation. The Council on Environmental Quality has identified western Kansas as part of a larger area undergoing moderate desertification and also reports the disappearance of surface water in the area.[94]

Groundwater and surface water are intimately related.[95] Most significantly for purposes of this Article, groundwater provides the base flow of rivers and streams. If enough groundwater is withdrawn, rivers may cease to flow as natural precipitation gravitates toward the aquifer's reduced level. Thus, in the state's area of heaviest irrigation, the mining of the Ogallala is one reason the Arkansas River has ceased to flow in southwest Kansas;[96] along much of a 150 mile stretch from the Colorado border to between Garden City and Dodge City (fig. III), dead cottonwood trees mark the dry riverbed.

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92. M. FUND, *supra* note 15, at 53. One would also expect substantial losses in the Sandsage Prairie itself; it lies on an east-west axis and is exposed to prevailing south and southwest winds. M. FUND & E. CLEMENT, *supra* note 19, at 59. In April, 1982, highways near Garden City were closed as 70 mph winds choked the area with blowing soil. *Id.*

93. Russell, *supra* note 72, at 13. Similar warnings have been issued for the Nebraska Sandhills; since they cover a much larger area, the Sandhills would be subject to even greater desertification. MISSOURI BASIN-GREAT PLAINS CAUCUS, *supra* note 40, at 8.

94. COUNCIL ON ENVTL. QUALITY, DESERTIFICATION OF THE UNITED STATES (1981), *cited in* M. FUND & E. CLEMENT, *supra* note 19, at 59.

95. For a general discussion, see F. MALONEY, S. PLAGER & F. BALDWIN, WATER LAW AND ADMINSTRATION: THE FLORIDA EXPERIENCE 1-4 (1968).

96. Groundwater pumping may not be the sole reason the Arkansas River has dried up. For years Kansas has complained that Colorado was retaining more than its alloted share under the Arkansas River Compact. *See* Note, *The Parting of the Waters—The Dispute Between Colorado and Kansas Over the Arkansas River*, 24 WASHBURN L.J. 99 (1984); Anton, *Feelings Run Deep on the Arkansas*, Kansas City Star, Feb. 23, 1986, at IA, col. 1. In 1985, the State of Kansas filed a motion for leave to file a complaint in the Supreme Court of the United States, which has original and exclusive jurisdiction over compact disputes between states. *See* U.S. CONST. art. III, § 2, cl. 2; 28 U.S.C. § 1251(a)(1982). On March 24, 1986, the Supreme Court granted the motion and agreed to hear the case. Kansas v. Colorado, 106 S. Ct. 1454 (1986)(No. 105, Original).

A 1981 United States Geological Survey report found that in order for the river's flow to stabilize, or for water table losses to cease, precipitation would have to be 25% greater than normal for three straight years; groundwater pumping would have to be reduced to 50% of the 1979 level; or the amount of water flowing from Colorado would have to increase. M. FUND & E. CLEMENT, *supra* note 19, at 58. Although the problem might be partially alleviated if Colorado were ordered to release more water, a timely resolution is not expected since *Kansas v. Colorado* may not be resolved for three to four years. Vogrin, *Water-Rights suit excites Stephan*, Topeka Capital J., Aug. 22, 1986, at 14, col. 5. Moreover, it is important to note that even if additional water were to be released, most of it would go not to replenish the aquifer, but to satisfy the appropriation rights of surface irrigators, many of whom can trace their allotments back to the turn of the century or before.

Further downstream on the Arkansas River is Cheyenne Bottoms, a major wetland area serving as a migration stopover for birds, such as the endangered whooping crane. Cheyenne Bottoms, however, is in serious danger of drying up.[97] Since the 1950s the refuge area has possessed a water right to divert streamflow from the Arkansas River to maintain the marsh habitat. Since 1980, however, reduced streamflow has caused the area to receive less than ten percent of its allocation. While Cheyenne Bottoms is outside the area overlying the Ogallala,[98] the reduced flow of the Arkansas clearly accounts for some of the problem.[99]

Stream depletion is not confined to the Arkansas River basin. From 1974 to 1982 over 700 miles of Kansas streams were lost to depletion, most of the losses occurring in the western part of the state.[100] Other streams may be lost in the distant future; for instance, it is predicted that the North and South Forks of the Solomon River may cease to flow within eight years.[101]

In 1980, the State of Kansas addressed the problem by adopting minimum streamflow legislation[102] that now applies to all or parts of nine streams.[103] Nonetheless, since the legislation requires that streamflow be taken into account only in the awarding of new appropriation rights,[104] streams which already have been severely impacted by appropriations—such as the Arkansas River in the southwest—will not be helped by the legislation.[105] Moreover, some currently undepleted streams may suffer future flow problems even if pumping ceases, as delayed effects may cause a stream to dry up several years after irrigation ends.[106]

Although the depletion of streams particularly impacts those who would otherwise draw water from them, most notably surface irrigators and cities, the injury extends to the larger community. Human society will be deprived of aesthetic and recreational opportunities. Just as importantly, wild animals will lose their habitat, and therein lies a lesson.

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97. M. FUND, *supra* note 15, at 80.

98. The Bottoms lie in a GMD that subjects groundwater pumping to a safe yield policy. Regulations of Big Bend Groundwater Management District No. 5, KAN. ADMIN. REGS. § 5-25-4 (1983).

99. Historically, late summer median flows at Great Bend, the city nearest Cheyenne Bottoms, have ranged from 50-60 cubic feet. Late summer flows since 1974, however, have ranged from only 5-10 cubic feet. KANSAS WATER OFFICE, KANSAS WATER PLAN, MANAGEMENT SECTION, SUBSECTION: MINIMUM DESIRABLE STREAMFLOWS 9 (1985).

100. *Id.* FISH, WILDLIFE AND RECREATION SECTION, SUBSECTION: STREAM RECOVERY, at 2.

101. Conversation with Robert Hooper, member of the Solomon Basin Advisory Committee (Sept. 27, 1985).

102. Act of April 18, 1980, ch. 332, 1980 Kan. Sess. Laws 1334-35.

103. KAN. STAT. ANN. § 82a-703(c) (Supp. 1986).

104. *Id.* § 82a-703(b) (1984). The same standards also govern applications for changes in use. *Id.* § 708(b).

105. KANSAS WATER OFFICE, KANSAS WATER PLAN, MANAGEMENT SECTION, SUBSECTION: MINIMUM DESIRABLE STREAMFLOWS 4 (1985).

106. *Id.* For an explanation of delayed effects, see Shupe, *Administration of Groundwater Rights: A Darkening Cloud Over Irrigated Agriculture*, 20 GONZ. L. REV. 729 (1984/85).

Though I confess the analogy may be somewhat strained, I believe that just as stream depletion is causing the dislocation of wildlife, the mining of the Ogallala is causing and will continue to cause significant human social problems.

For example, Garden City, the largest town in the area overlying the Kansas portion of the Ogallala, has undergone significant social change since the 1982 opening of the world's largest meat processing plant, Iowa Beef Processors, Inc. (IBP), in nearby Holcomb.[107] The plant would not exist but for irrigation on the High Plains; it was drawn to the area by the presence of numerous feedlots, in which hundreds of thousands of head of cattle are fattened on corn that could not be grown without irrigation.[108]

In return for having received the plant, Finney County has provided IBP tax breaks and financing. Expenditures for municipal services have also increased. In 1982, the City of Holcomb spent $350,000 on sewer and water improvements; at the same time, Garden City school officials anticipated having to construct new elementary schools[109] and to raise property taxes in order to accommodate several hundred new pupils.

While a large share of the new incomes will certainly recirculate into the local economy, the new wealth has given rise to serious social problems. Initially, housing construction could not keep pace with the population increase, and some IBP employees reported living in their cars in roadside parks. To help remedy the situation, IBP proposed the construction of a large mobile home park but insisted that it be located on the opposite side of town from the plant. Consequently, Garden City is now experiencing increased traffic problems. In short, the location of the IBP plant in the Garden City area has had numerous unexpected adverse effects.

Once again, I am not advocating a roll-back-the-clock or a no-growth philosophy. Communities will always experience growth pains as

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107. M. FUND & E. CLEMENT, *supra* note 19, at 48-53. The IBP plant (IBP is a subsidiary of Occidental Petroleum) is the largest of a number of slaughterhouses and processing plants that have dotted southwestern Kansas since the 1960s. In 1980, Excel Corporation, a subsidiary of Cargill, built a major plant in Dodge City that now employs 1000 workers and can slaughter and process 3800 head of cattle a day. *See* Bates, *Garden City used to 'smell of money'*, Topeka Capital J., Mar. 16, 1986, at 6, col. 3 [hereinafter Bates I]; Bates, *Packing Plants put money in Kansans' pockets*, Kansas City Star, Mar. 23, 1986, at 5E, col. 1 [hereinafter Bates II].

108. During the irrigation boom period, Kansas beef production jumped from 1,890,000 head in 1970 to 3,400,000 head in 1983. Kansas Natural Resource Council, *supra* note 38, at 7. In 1985, Kansas ranked first among the states in beef packing, processing 4.2 billion pounds, more than double the 1980 figure of 1.9 billion pounds. Bates I, *supra* note 107, at 3, col. 3; Bates II, *supra* note 107, at 5E, col. 3.

109. In the fall of 1979, when the decision to build the plant was made, 4540 students were enrolled in the Garden City schools; by 1985, the number had risen to 5775. About 19% of students have one or both parents employed in the beef packing industry. The school district now uses 25 portable classrooms and has plans for construction of two new grade schools. One new grade school opened in 1986, the other in 1987. Bates I, *supra* note 107, at 3, col. 6. School superintendent Jim Phifer states the influx has presented a "dramatic challenge." Bates II, *supra* note 107, at 5E, col. 4.

their economic bases expand. But in Garden City's case, the pains stem from an industry that is heavily reliant on declining groundwater supplies. Thus, the question arises: What will happen when the water runs out? Although we can only conjecture, it is not unrealistic to believe that the area will experience considerable unemployment and emigration; coincidentally, the remaining residents will struggle to pay the cost of the initial, short-term expansion.[110] Variations of this scenario may be played out all over the High Plains, and their ripple effects will impact entire state economies.[111] Surely such eventualities should make us question the long-term wisdom of a social philosophy premised on the all-out development of scarce natural resources, instead of one based on their conservation.

B. *Intergenerational Justice*

The jurisprudential argument for a long-term conservation ethic is the principle requiring justice between generations. In the seminal work *A Theory of Justice*, John Rawls states:

> [Generations] are not subordinate to one another any more than individuals are. The life of a people is conceived as a scheme of cooperation spread out in historical time. It is to be governed by the same conception of justice that regulates the cooperation of contemporaries. No generation has stronger claims than any other . . . pure time preference is unjust: it means . . . that the living take advantage of their position in time to favor their own interests.[112]

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110. "The legacy of mining is unfortunately as bleak economically as it is ecologically, for it has frequently left in its wake communities who have invested in homes, roads, schools, and other public and private facilities and whose post-mining economy can't retire the debt." MISSOURI BASIN-GREAT PLAINS CAUCUS, *supra* note 40, at 9; *see also* Center for Rural Affairs, *supra* note 67, at 64-65.

111. *Cf.* Wadley, *Small Farms: The USDA, Rural Communities and Urban Pressures*, 21 WASHBURN L.J. 478, 497-500 (1982)(rural communities, whose economies are based on farming, will decline as agriculture declines); *Down and Out in America* (Minn. Public TV Documentary 1985).

The aquifer's depletion would, I suggest, be even more economically and socially devastating than the current agricultural debt crisis, a crisis which has "put many of the nation's rural communities under the most severe stress since the Great Depression." *Farm crisis ravaging towns, study says*, Kansas City Times, May 24, 1986, at A-3, col. 1 [hereinafter *Farm Crisis*]. Because of the farm debt crisis, tax revenues in six of eight Midwestern Great Plains and Western States grew slower than the national average the last two fiscal years; revenues actually declined in four of the states in one of those two years. *Id.*

The farm debt crisis has hit Kansas particularly hard. In 1985, the state led the nation in bank closings. *Cf.* Frederickson & Hawver, *Slumping farm economy troubles Kansas banks*, Topeka Capital J., June 9, 1985, at 1, col. 1. Kansas is currently experiencing substantial deficiencies in tax revenue. Petterson, *Kansas gets gloomy news on revenue*, Kansas City Times, Apr. 1, 1986, at 1, col. 1; Petterson, *Kansas facing grave shortfall in '86 budget*, Kansas City Times, Nov. 7, 1985, at 1, col. 1.

112. J. RAWLS, A THEORY OF JUSTICE 289, 295 (1971); *see* State v. Dexter, 32 Wash. 2d 551, 202 P.2d 906 (1949).

> Edmund Burke once said that a great unwritten compact exists between the dead, the living, and the unborn. We leave to the unborn a colossal financial debt, perhaps inescapable, but incurred, none the less, in our time and for our immediate benefits. Such an unwritten compact requires that we leave to the unborn something more than debts and depleted natural resources. Surely, where natural resources can be utilized and at the same

The principle is essentially one of distributive justice that has been used since the time of Aristotle to divide society's wealth based on merit.[113] In the environmental context the principle requires that "the burdens and benefits arising out of human relationships and natural conditions should be fairly distributed between all persons involved."[114] Since, as Rawls demonstrates, the claims of those alive today have no more merit than the claims of those who follow, the involved group must include future generations.[115]

The principle is not new to American law and policy. Fundamental property doctrines such as the Rule Against Perpetuities or the prohibition against restraints on alienation protect the opportunities of future generations to make choices about the use of capital wealth.[116] We have

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time perpetuated for future generations, what has been called 'constitutional morality' requires that we do so.

Id. at 556, 202 P.2d at 908. In *Dexter*, the Washington Supreme Court upheld a statute requiring lumber companies to provide for reforestation, either by leaving trees uncut or by restocking. *Id.* at 563, 202 P.2d at 912.

113. ARISTOTLE, BOOK V OF THE NICHOMACHEAN ETHICS, at chs. 2-3, *reprinted in* 9 GREAT BOOKS OF THE WESTERN WORLD 377-79 (1980).

114. Center For Rural Affairs, *supra* note 67, at 57; *cf.* Duncan, *The Future Affirmative Action: A Jurisprudential/Legal Critique*, 17 HARV. C.R.-C.L.L. REV. 503 (1982). In the employment context, distributive justice requires that benefits and burdens "be distributed in accordance with relevant considerations such as the rights, deserts, merits, contributions and need of the recipients." *Id.* at 520 (quoting Nickel, *Preferential Policies in Hiring and Admissions: A Jurisprudential Approach*, 75 COLUM. L. REV. 534, 539 (1975)).

115. Justice between generations is only one requirement stemming from Rawls' following two principles of justice: 1) each person has an inviolable right to the maximum liberty that is consistent with the same degree of liberty in others, and 2) social and economic inequalities are to be ordered so that they are "(a) reasonably expected to be to everyone's advantage, and (b) attached to positions and offices open to all." J. RAWLS, *supra* note 112, at 60. Rawls would have his two principles implemented by a social contract, established when society is in the "original position," namely when it must determine fundamental precepts by which it will be governed. *Id.* at 17-22, 118-92. Rawls avoids the possibility of a decision maker's own self-interest skewing the precepts by placing everyone behind a "veil of ignorance," thereby making them unaware of what status they will hold in the society. *Id.* at 18-19. To accomplish justice between generations the veil is extended so that individuals are also ignorant of the generation to which they will belong. *Id.* at 287. Time preferences are thus irrelevant. *Id.* at 293-98.

Society must then determine a "just savings principle": the measure of capital accumulation that should be passed on to future generations.

> In attempting to estimate the fair rate of saving the persons in the original position ask what is reasonable for members of adjacent generations to expect of one another at each level of advance. They try to piece together a just savings schedule by balancing how much at each stage they would be willing to save for their immediate descendants against what they would feel entitled to claim of their immediate predecessors. Thus imagining themselves to be fathers, say, they are to ascertain how much they should set aside for their sons by noting what they would believe themselves entitled to claim of their fathers. When they arrive at an estimate that seems fair from both sides, with due allowance made for the improvement in their circumstances, then the fair rate (or range of rates) for that stage is specified. Now once this is done for all stages, we have defined the just saving principle. When this principle is followed, adjacent generations cannot complain of one another; and in fact no generation can find fault with any other no matter how far removed in time.

Id. at 289-90.

The "just savings principle" clearly applies to items such as accumulations of monetary wealth and means of production, and investment in education. And, although not mentioned by Rawls, the principle logically will govern consumptive activities. Thus, it would regulate the amount of nonrenewable resources each generation would be required to pass on.

On applying intergenerational analysis to natural resources, see Weiss, *supra* note 72. For discussion of the analysis' application to property law in general, see Gjerdingen, *supra* note 72.

116. 5A R. POWELL ON REAL PROPERTY §§ 759, 839 (1985).

also recognized that the principle applies with equal force to natural and cultural resources.[117]

Thus, we have created national parks, monuments and wildernesses,[118] and protected historic sites[119] as a way of preserving our heritage for those who follow. Having protected natural and cultural resources for the visual and aesthetic enjoyment of later generations, it would indeed be anomalous to fail to protect water, a physical resource that is necessary not only to dependable agriculture on the High Plains but to life itself.

I believe that taken together, the principles of stewardship and intergenerational justice can and must form the foundation of a new water conservation ethic. As will be discussed at length, this means abrogating policies that I believe to be fundamentally oriented toward development. Thus, in one sense the proposal might be considered revolutionary, but in reality the change constitutes a return to principles of conservation that are fundamental to Anglo-American water law.

C. *The Doctrine of Usufruct*

The doctrine of usufruct,[120] described by Jefferson,[121] has served as a foundation of water law since Roman times.[122] Under this doctrine, the waters of rivers and streams are not owned by private individuals, but like other common things such as air and wild animals,[123] they are held commonly by all in what is called the "negative community."[124] Accordingly, downstream riparian owners were entitled to an undiminished

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117. *See* Weiss, *supra note* 70, at EBW 1; Weiss, *supra* note 72, at 502-03, 528-34.

118. For various programs, too numerous to delineate, see 16 U.S.C. (1982).

119. Historic sites are protected as national monuments and national historic sites, and parks by various sections of 16 U.S.C. (1982); as historic sites and antiquities, *id.* § 461-467; by the National Register of Historic Places, *id.* § 470-470ll; and by the National Trust for Historic Preservation, *id.* § 468.

120. Justinian defines the term as "the right to use and enjoy the things of another, their substance remaining unimpaired." J. INST. 2, 4 pr., *cited in* J. THOMAS, TEXTBOOK OF ROMAN LAW 203 (1976). Since the only way to avoid impairing the Ogallala's corpus—implementing a safe yield policy—is not a realistic possibility, I am not using the term literally, but rather to support the principle that water users' rights are limited and subordinate to the public's. For discussion of the feasibility of implementing a safe yield policy, see *supra* note 90, *infra* note 278, and accompanying text.

121. Letter, *supra* note 1.

122. 1 S. WIEL, WATER RIGHTS IN THE WESTERN STATES 1-21 (3d ed. 1911).

123. "By natural law these things are common to all, viz: Air, running water, the sea and as a consequence the shores of the sea." J. INST. 2.1.1 pr., *cited in* 1 S. WIEL, *supra* note 122, at 2. On the inclusion of wild animals in the *res communes*, see Geer v. Connecticut, 161 U.S. 519, 523-27 (1896), *rev'd on other grounds*, Hughes v. Oklahoma, 441 U.S. 322 (1979). By contrast, other natural resources were said to be *owned* by the state and were *res publicae*. "Such were highways, rivers, and harbors, so that all might navigate and fish." J. INST. 2.1.1 pr., *cited in* Dunning, *The Public Trust Doctrine and Western Water Law: Discord or Harmony?*, 30 ROCKY MTN. MIN. L. INST. 17-1, 17-5 n.7 (1985).

124.

> The first of mankind had in common all those things which God had given to the human race. This community was not a positive community of interest, like that which exists between several persons who have the ownership of a thing in which each has his particular portion. It was a community, which those who have written on this subject have

streamflow, and upstream owners only a usufructuary right—a right of use in water flowing past their property.[125] Blackstone announced the doctrine as understood in English and later in American law: "For water is a movable, wandering thing, and must of necessity continue common by the law of nature, so that I can have only a temporary, transient, usufructuary property therein."[126] While the riparian doctrine evolved to permit an upstream owner to appropriate some of the water as long as it was for a "reasonable use,"[127] the remainder of the flow continued as a common resource.

Initially, the concept of commonality was not applied to groundwater. Instead, relying on the doctrine of *Cujus est solum ejus, usque ad coelum et ad inferos*—by which landowners possessed everything in a direct line between the surface of their land and the centers of the earth and the sun[128]—it was held that the owner of land had absolute ownership rights to the water beneath the land.[129] But as hydrologists discovered that groundwater is often found in pools underlying large areas, and that a surface owner's well could drain the water from beneath a neighbor's land, the courts asserted the common interest by imposing "reasonable use" restrictions.[130]

Eventually recognizing the similarities between surface water and groundwater, and the interaction between the two, virtually all Western States, including Kansas, have determined that all water should be governed by one set of rules. In recognizing the importance of water in the region, these states also have declared that control over all waters is vested in the public.[131] Thus, the state controls the water as a common

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called a negative community, which resulted from the fact that those things which were common to all belonged no more to one than to the others.

Geer v. Connecticut, 161 U.S. 519, 525 (1896)(quoting POTHIER, TRAITE' DU DROIT DE PROPRIE'TE' No. 21).

125. 1 S. WIEL, *supra* note 122, at 1-21.

126. 2 W. BLACKSTONE, COMMENTARIES* 18 (Old English revised). Justice Story states, "Strictly speaking he has no property in the water itself, but a simple use of it while it passes along." Tyler v. Wilkinson, 24 F. Cas. 472, 474 (C.C.D.R.I. 1827)(No. 14,312). According to Kent, "He has no property in the water itself, but a simple usufruct while it passes along." 3 J. KENT, COMMENTARIES 353.

127. 1 S. WIEL, *supra* note 122, at 792-831. For example, in order to encourage irrigation the State of Kansas enacted legislation in 1886 that modified the natural flow rule to incorporate a "reasonable use" doctrine. Act of February 19, 1886, ch. 115, 1886 Kan. Sess. Laws 154-56; *see* Williams v. City of Wichita, 190 Kan. 317, 374 P.2d 578 (1962); Clark v. Allaman, 71 Kan. 206, 80 P. 571 (1905). For discussion of the history of Kansas water law in general, see E. SHURTZ, REPORT ON THE LAWS OF KANSAS PERTAINING TO GROUND WATER (Kansas Water Resources Bd. Bulletin No. 5, 1960); E. SHURTZ, REPORT ON THE LAWS OF KANSAS PERTAINING TO THE BENEFICIAL USE OF WATER (Kansas Water Resources Bd. Bulletin No. 3, 1956).

128. 2 W. BLACKSTONE, *supra* note 126, at 18.

129. 2 S. WIEL, *supra* note 122, at 970. The decision most often cited for the proposition is the English case, Acton v. Blundell, 152 Eng. Rep. 1223 (1843).

130. 2 S. WIEL, *supra* note 122, at 973-1008, 1040-49.

131. *E.g.*, KAN. STAT. ANN. § 82a-701 (1984); *see* MONT. CODE ANN. § 85-2-101 (1985); NEB. REV. STAT. §§ 46-202 to -601 (1984); OR. REV. STAT. § 537.110-.120 (1985). The Kansas statute was upheld in Williams v. City of Wichita, 190 Kan. 317, 374 P.2d 578 (1962). For discussion of *Williams*, see *infra* text accompanying notes 303, 344-52.

resource; the irrigator possesses the usufruct, the right to use it consistent with established regulations.[132]

As later sections of this Article will reveal, elements of Kansas water law stress the usufructuary nature of water rights, by subordinating them to the common or public interest. Unfortunately, other statutory elements have predominated and the public interest has been conceived primarily in terms of the development of water, based on the misconceived notion that it is an unlimited resource. Consequently, little thought has been given to long-term needs. But we now realize the Ogallala Aquifer is finite, and its potential demise is less than a generation away. Therefore, if we are to sustain long-term dependable agriculture in western Kansas, we have no choice but to introduce the concepts of stewardship and intergenerational justice into our water law. These principles apply even if only remote future generations will suffer from lack of water. However, because it is perhaps our children's generation that will

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132. A doctrine similar to usufruct—the public trust doctrine—might also be used to describe the public's interest in water. However, I have chosen to emphasize the doctrine of usufruct. A brief explanation of public trust principles makes this choice clear.

Over time the two categories of natural resources, *res communes* and *res publicae*, partially merged to create the public trust doctrine. For discussion of these two categories, see *supra* note 123. According to the public trust doctrine, the state holds title to tidal lands and waters, and to the beds of navigable streams. Since the time of *Magna Carta*, the state has been unable to alienate such property and may permit others to occupy or use it only in ways consistent with the trust. *See* Illinois Cent. R.R. Co. v. Illinois, 146 U.S. 387 (1892). For discussion of *Illinois Central*, see *infra* note 377. For example, all use of navigable streams in the United States is subject to a navigation servitude held by the federal government. *E.g.*, United States v. Willow River Power Co., 324 U.S. 499 (1945). The federal navigation servitude is actually a hybrid trust based on the commerce clause of the United States Constitution. U.S. CONST. art. I, § 8. Except in areas where title to streambeds was granted to individuals by the Spanish Crown, states, as successors to the British Crown, own the beds. Kansas v. Colorado, 206 U.S. 46, 93-94 (1906).

Some suggest the doctrine should be expanded to reflect concern for resources other than water and for water-related activities other than navigation, commerce and fishing, the doctrine's traditional foci. *E.g.*, Cohen, *The Constitution, The Public Trust Doctrine, and the Environment*, 1970 UTAH L. REV. 388; Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 473 (1970). Indeed, two states have ruled that their water appropriations schemes are subject to the doctrine. National Audubon Soc'y v. Superior Court, 33 Cal. 3d 419, 658 P.2d 709, 189 Cal. Rptr. 346 (1983), *cert. denied*, 464 U.S. 977 (1983); United Plainsmen Ass'n v. North Dakota State Water Conservation Comm'n, 247 N.W.2d 457 (N.D. 1976). For analysis of these cases, see Dunning, *supra* note 123. Thus, in both North Dakota and California, officials must consider the public trust before issuing a permit; in California, appropriations remain subject to the doctrine and may be adjusted if necessary to comply therewith. *Audubon*, 33 Cal. 3d at 447, 658 P.2d at 728, 189 Cal. Rptr. at 365. Yet, important as these decisions are, both states, consistent with tradition, restrict the doctrine's coverage to navigable waterways. *Id.* at 435-37, 658 P.2d at 719-21, 189 Cal. Rptr. at 356-57; United Plainsmen Ass'n v. North Dakota Water Conservation Comm'n, 247 N.W.2d 457, 461 (N.D. 1976). In other words, not even the most far-reaching public trust decisions suggest that the doctrine could be extended to cover groundwater. Accordingly, it seems advisable to explain the public's interest in terms of usufruct.

On the other hand, it would be a mistake to draw hard and fast lines between the doctrines. For example, modern water codes, like the one in Kansas, operate in a manner conceptually analogous to public trust law. J. PECK, LEGAL CONSTRAINTS ON THE STATE OF KANSAS IN IMPOSING CONSERVATION PRACTICES ON HOLDERS OF EXISTING WATER RIGHTS, at V11-1 to 12 (Kansas Water Resources Research Inst. 1986); 1 S. WIEL, *supra* note 122, at 11-13. Thus, interpretation of the public trust doctrine should be instructive as we define the nature of statutory water rights. Furthermore, it is unimportant whether the state holds title to the water or whether it simply controls its distribution. In either case, appropriators do not own the water but use it subject to restrictions established by state law.

run out of water, the policy change is dictated, in practicality, by the immediacy of the crisis.

Incorporating these principles into our law by including future generations within the "negative community" is consistent with the law of usufruct as characterized by Jefferson.[133] Indeed, doing so would be an affirmation of the ancient doctrine in accord with modern ecological necessity. In a time when natural resources such as water are becoming scarce, recognizing that we must share resources with future generations is the only way the doctrine of usufruct can remain viable.

I believe the necessary policy adjustment can be accomplished largely through reinterpretation of the existing water code by focusing attention on those elements that emphasize the public and usufructuary nature of water rights. First, however, we must examine how the development-oriented aspects of Kansas law have contributed to the depletion of the Ogallala Aquifer.

IV. THE CURRENT INSTITUTIONAL STRUCTURE

Current Kansas groundwater policies are overwhelmingly directed toward development; to the extent they encourage conservation, they implement only a policy of planned depletion. These policies, therefore, are as instrumental in the mining of the Ogallala as the technological innovations and federal policies described earlier. This section of the Article will examine the two basic water allocation statutes—the Water Appropriation Act of 1945 and the Groundwater Management Act of 1972—as well as the State Water Plan of 1985. The analysis will focus on the most troublesome features of these policies and will be essentially critical in nature. Discussion of the statutory elements that provide the basis for a conservation ethic will occur in part V.

A. *The Water Appropriation Act*

The Water Appropriation Act of 1945 (WAA) embodies the most important state water policies relating to irrigation. The Act was proposed by a governor's task force,[134] whose appointment was prompted by a Kansas Supreme Court ruling that existing statutes did not give the state authority to allot groundwater among various claimants.[135] Recognizing the interrelationship of surface and groundwater, the legislature passed, upon recommendation of the task force, an Act that replaced the various doctrines governing the allocation of water with a unified

133. Letter, *supra* note 1.

134. *A Report to the Governor of Kansas by A Committee Appointed by Him to Study and Investigate the Laws of the State Relating to the Appropriation of Water and to Report Its Findings and Suggestions to Him* (December, 1944)[hereinafter *Report*].

135. State, *ex rel.* v. Board of Agric., 158 Kan. 603, 149 P.2d 604 (1944).

scheme.[136] The Act is administered by the Chief Engineer, Division of Water Resources of the State Board of Agriculture.[137] The core of the Act is the declaration which states, "[A]ll water in the state of Kansas is hereby dedicated to the use of the people of the state . . . ."[138]

The Act also provides, "[A]ll waters within the state may be appropriated for beneficial use."[139] Although the appropriation mechanism contains elements of the common-law "prior appropriation" doctrine,[140] it establishes a process for acquiring a water right that differs substantially from the common-law mechanism. In a common-law prior appropriation system, a water right vests when the water is put to use; no governmental permit is required.[141] By contrast, Kansas now has an administrative system under which users of both surface and groundwater obtain rights by applying to the Chief Engineer for an appropriation permit. Under the original enactment one could appropriate water without a formal filing by meeting the common-law requirements. But since they were not state certified, those appropriations carried a priority junior to those perfected by permit.[142] Since 1977, it is a criminal offense to appropriate or threaten to appropriate water, except for domestic purposes, without first obtaining a permit.[143] In short, the issuance of a permit is now the vesting event.

Applicants for permits must submit statements setting forth, among other things, the maximum rate at which water will be withdrawn and the total annual quantity of water that is sought.[144] Before a permit is issued, the Chief Engineer makes two determinations.[145] First, as part of the determination that a proposed use will not impair a use under an existing right, there must be a conclusion that the new appropriation will not unreasonably raise or lower the static water table. Second, the Chief Engineer must determine that a proposed use will not prejudicially or unreasonably affect the public interest; doing so requires consideration of minimum streamflow requirements,[146] the area, local safe yield and recharge rates, and the priority and extent of existing rights. If unable to make both findings, the Chief Engineer may either reject the application or require its modification to conform to the public interest so that the "highest public benefit and maximum economical development may re-

136. KAN. STAT. ANN. § 82a-701 to -731 (1984); *Report, supra* note 134; *see supra* note 127 (discussion of the history of Kansas water law).
137. KAN. STAT. ANN. § 82a-701 to -731 (1984).
138. *Id.* § 82a-702.
139. *Id.* § 82a-703.
140. For discussion of the common-law doctrine, see *infra* text accompanying notes 152-53.
141. 1 S. WIEL, *supra* note 122, at 388.
142. Williams v. City of Wichita, 190 Kan. 317, 338, 374 P.2d 578, 594 (1962).
143. KAN. STAT. ANN. § 82a-728 (1984), *construed in* F. Arthur Stone & Sons v. Gibson, 230 Kan. 224, 630 P. 2d 1164 (1981). For discussion of *Stone*, see *infra* text accompanying notes 354-60.
144. KAN. STAT. ANN. § 82a-709 (1984).
145. *Id.* § 82a-711.
146. For discussion of this policy, see *supra* text accompanying notes 102-04.

sult from the use."[147] Each permit specifies the quantity of water that may be used,[148] although this amount may be less than requested.[149] Additionally, the permit may also set conditions that the Chief Engineer deems necessary to protect the public interest.[150]

Once a permit is issued, and the appropriation right is perfected by the actual diversion of water, an irrigator's "priority" is confirmed.[151] The rights that derive from that priority are then determined as they would have been by the common-law prior appropriation doctrine. "As between persons with appropriation rights, the first in time is the first in right."[152] In other words, in a time of water scarcity the most junior appropriator, the one with the most recent priority date, will be the first to lose the right to irrigate; all others with senior rights are entitled to take their allotments first. The appropriator with the next most recent priority date will be next to lose his or her allotment, and so on. Because the Act makes no provision for proportional reductions, an appropriator is entitled to receive an entire allotment before the next junior appropriator receives any allotment; put another way, a water user who loses out to one with an earlier priority loses his or her entire appropriation. The Act gives an appropriator seeking to protect an allotment the right to enjoin a junior appropriator's interference.[153]

Appropriators who wish to change the place of use, the nature of a use, or the point of diversion, for example, by substituting a new well for an old one, must receive the approval of the Chief Engineer. The applicant must demonstrate that the proposed change is reasonable and will not impair existing rights, and that the water will still come from the same local source of supply. If the Chief Engineer approves, the appropriator retains his or her original position on the priority list.[154]

Finally, an appropriator can forfeit a right by failing to exercise it. Under the "use it or lose it" provision, one who does not make beneficial use of water for three successive years is deemed to have "abandoned" a right. The right holder is entitled to a hearing prior to the entry of a termination order.[155] By regulation, certain situations

147. KAN. STAT. ANN. § 82a-711 (1984).
148. *Id.* § 82a-711a.
149. *Id.* § 82a-712.
150. *Id.*
151. The issuance of a permit allows the irrigator to construct diversion works which, upon completion, will be inspected by the Chief Engineer. If the works comply with the permit, a certificate of appropriation will be issued. *Id.* § 82a-712 to -714. If the amount of water actually put to a beneficial use is less than the amount approved in the permit, the certificate, which determines the appropriation right, covers only the smaller quantity. KAN. ADMIN. REGS. § 5-3-8 (1983). Once an appropriator obtains a certificate, priority dates back to the date the permit application was filed. KAN. STAT. ANN. § 707(c) (1984).
152. KAN. STAT. ANN. § 82a-707(c) (1984).
153. *Id.* § 82a-716.
154. *Id.* § 82a-708b.
155. *Id.* § 82a-718.

will not result in a termination. The two situations relevant to this Article are: 1) when the use has been temporarily discontinued to permit soil, moisture and water conservation, and 2) when management and conservation practices result in the use of less water than is authorized.[156]

Analysis of the WAA.

The WAA establishes a developmental water ethic that is the principal cause of the Ogallala Aquifer's depletion. First, the Act sets forth a presumption that water should be used rather than conserved. Second, in protecting the rights of those who have utilized the Act to develop water, the Act perpetuates inefficient water uses, further aggravating the crisis.

By providing that "all waters within the state may be appropriated,"[157] the WAA set the stage for the large-scale development of water. The provision's general purpose—to provide Kansans living in a semi-arid to arid state with adequate water supplies—was appropriate. But the drafters also intended the provision to ensure that as much water as possible would be developed. "[U]nused water cannot wisely be held in perpetuity for a common-law owner who may never have use for it, without resulting in underdevelopment permitting the water to flow out of the state and on toward the ocean, as an economic waste and loss of a valuable natural resource."[158] This statement reveals a fundamental misconception: unused water is wasted water. Today, hundreds of miles of dry stream beds[159] testify to the statement's shortsightedness. Nonetheless, the developmental ethic that it embodies has been allowed to serve as the WAA's operative principle. Applied to groundwater, it has produced the crisis on the Ogallala Aquifer.

The statement refers to surface water, and it should have been obvious that it has no applicability to a nonrechargeable aquifer. The Ogallala is not an underground river; undeveloped water will not flow to a surrounding state or toward the ocean, but will remain in place for future use.[160] The unsuitability of a development-oriented policy for groundwater should have been apparent to the Act's drafters, who recognized that withdrawals from the Ogallala even then were having serious adverse affects. Their report stated, "So extensive has the use of ground water for irrigation become in general that in some instances the ground-

156. KAN. ADMIN. REGS. § 5-7-1 (1983).

157. KAN. STAT. ANN. § 82a-703 (1984).

158. *Report, supra* note 134, at 43-44. For a similar statement, see *id.* at 52. In light of such statements, the "conservation" of water "for the greatest benefit" of Kansas, which the drafters also intended, seems to envision making sure water is used in Kansas rather than Missouri or Oklahoma.

159. For a discussion of the stream depletion caused by both surface and groundwater development, see *supra* text accompanying notes 95-106.

160. Conversation with Howard O'Connor, United States Geological Survey (December 30, 1985).

water level is steadily declining, while in others large quantities of surface water (stream flow) is going into groundwater recharge."[161] Specifically, the committee found that movement of groundwater into the channel of the Arkansas River had stopped except during very wet periods, and that frequently the water table was lowered below the bed of the river.[162]

Despite those problems, the committee recommended that groundwater be governed by the same rules as surface water. Because of the interrelationship between surface water and groundwater, the drafters felt the "orderly development" of water resources would be hampered by the establishment of two separate policies.[163] While the development ethic once again carried the day, the report contained a cautionary note:

> The beds of sand and gravel found under the high plains in the western part of the state and in certain river valleys constitute valuable natural reservoirs for the collection and storage of water. They provide efficient and economical storage which should be developed *to the limit of their safe annual yields.*[164]

As previously discussed, recharge of the Ogallala is so slight that it effectively has no "safe yield."[165] Accordingly, virtually no further development could have occurred if the report had been interpreted literally. Nevertheless, some caution would have been appropriate, perhaps in the way certain statutory terms were interpreted. For instance, in determining whether a proposed appropriation will "prejudicially and unreasonably affect the public interest," the Chief Engineer is required to consider, *inter alia*, the "area, safe yield and recharge rate" of the water supply.[166] Thus, even though imposing a strict safe yield standard may have been unworkable, permitting withdrawals at ten to fourteen times the recharge rate[167] is surely inconsistent with both the spirit of the provision and the "public interest."

Furthermore, section 703 of the Act, which authorizes the appropriation of water, contains a significant limitation: water may be appropriated only for beneficial use.[168] The Act does not define the term; however, the Chief Engineer, consistent with the WAA's developmental thrust, has rendered this restriction pointless with a regulation that declares any and all irrigation, regardless of its efficiency, to be a beneficial use.[169] In short, the only provision that is read literally is the declaration

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161. *Report*, *supra* note 134, at 10.
162. *Id.* at 14.
163. *Id.* at 16.
164. *Id.* (emphasis added).
165. For a discussion of the concept, see *supra* text accompanying notes 48, 90.
166. KAN. STAT. ANN. § 82a-711 (1984).
167. *See supra* text accompanying note 49.
168. *See* KAN. STAT. ANN. § 82a-703 (1984).
169. Isolating a section of the Act that establishes preferences among a list of various broadly defined uses, KAN. STAT. ANN. § 82a-707(b) (1984), the Chief Engineer essentially reproduces the list in the regulatory definition: "[b]eneficial uses of water are domestic, stockwatering, municipal,

that "all waters within the state may be appropriated."[170] Our unwillingness to heed cautionary elements in the WAA and in its legislative history demonstrates, perhaps most clearly, the dominance over water policy exerted by the misconception that unused water is wasted water.[171]

Although it is the presumption in favor of development that has contributed most to the depletion of the Ogallala, it is not the lone culprit. The prior appropriation doctrine itself can be characterized as anticonservation; not only does it encourage development by protecting the financial investments of those who develop water,[172] it leads to the waste of water in a number of ways.[173] To begin with, the allotments of the most senior appropriators remain quantified on the basis of early irrigation technology that is considerably less efficient than that now available.[174] For example, furrow irrigation, in which water passes through trenches between the rows, provides plants nearest the head of the ditch with too much moisture and those near the far end with too little. Attempts to achieve uniformity result in the deposit of a substantial amount of tailwater at the far end of the field. Unless the excess is recycled, it becomes surface run-off which may evaporate or soak into shallow surface aquifers that lack sufficient water pressure to be pumpable. Similarly, while sprinkler systems, such as center pivots, are generally more efficient than furrow irrigation, they account for significant water losses. In windy and arid regions, such as western Kansas, up to thirty percent of water used in such systems may evaporate without hitting the ground.[175]

More efficient techniques are now available.[176] For example, trickle or drip irrigation, whereby small amounts of water are applied directly at the root zone, is now utilized on over 200,000 acres of American farmland.[177] Studies show that such systems use significantly less water (forty-two percent in the case of grain sorghum) than furrow or sprinkler systems.[178] Water can also be saved through the use of other techniques

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irrigation, industrial, recreational, water power and artificial recharge." KAN. ADMIN. REGS. § 5-1-1(f) (1983).

170. KAN. STAT. ANN. § 82a-703 (1984).

171. For discussion of the origin of this notion, see *supra* text accompanying notes 157-59.

172. *Report*, *supra* note 134, at 44.

173. *See* J. SAX, WATER LAW, PLANNING & POLICY 271-84 (1968); Pring & Tomb, *License to Waste: Legal Barriers To Conservation And Efficient Use of Water In The West*, 25 ROCKY MTN. MIN. L. INST. 25-1 (1979); Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483 (1982).

174. *See generally* Shupe, *supra* note 173, at 502-07.

175. *Id.*

176. *Id.*; *see* A. BIERE, E. KANEMASU & E. LEE, MODELING CROP RESPONSE FOR ECONOMIC WATER USE FOR WATER CONSERVATION (Kansas Water Resources Research Inst. 1981); K. FREDERICK & J. HANSON, *supra* note 41, at 165-79; E. KANEMASU, A STUDY ON THE EFFECT OF WATER DEFICIT ON WATER USE EFFICIENCY (Kansas Water Resources Research Inst. 1978).

177. Shupe, *supra* note 173, at 504-06.

178. *Id.* at 504.

such as irrigation scheduling, which calculates the amount of moisture and the time when it is needed based upon soil type and climate.[179]

Unfortunately, the prior appropriation system has discouraged irrigators from improving their water use efficiency. Saving water through conservation arguably amounts to a tacit admission that the full amount of an appropriation is no longer needed, a conclusion that might lead authorities to determine that the unneeded portion is no longer being put to beneficial use.[180] Since the Act provides that allotments not used beneficially for three successive years are deemed abandoned,[181] irrigators are encouraged to "use it or lose it." In effect, the Act encourages that which it purports to prevent—waste.

While the Chief Engineer has brought approximately 200 forfeiture actions in the last two years, most in northwest Kansas,[182] it is apparent that he still considers the underlying Act to be development-oriented. Otherwise, it would be unnecessary to promulgate a regulation that exempts abandonment actions in cases where the nonuse of water has resulted from improved conservation practices.[183] Prior to this regulation, the Chief Engineer could have brought abandonment actions in situations in which only a portion of an allotment was being used. However, doing so would not necessarily have conserved water. In those areas not fully appropriated, the language of the Act declaring "all water may be appropriated" would have required the Chief Engineer to allot the recouped, unused water to someone else. The regulation avoids that scenario, and thus, given the WAA's outdated developmental orientation, probably encourages water conservation in the easiest way possible—through the back door. But existence of such an anomalous situation sends a clear message that the time has come to approach the problem via the front door, to substitute a long-term conservation ethic for the current developmental bias.

B. *The Groundwater Management Act*

By the late 1960s it was apparent that Kansas groundwater resources were being seriously depleted. Accordingly, in 1968 the legislature responded by passing a Groundwater Management Act.[184] There were no management districts formed under this Act,[185] and it was re-

179. *Id.* at 506-07.

180. For a definition of beneficial use, see *supra* note 169 and accompanying text.

181. KAN. STAT. ANN. § 82a-718 (1984).

182. Conversation with Lee Rolfes, Chief Counsel, Division of Water Resources (March 18, 1986)[hereinafter Rolfes Conversation I].

183. For discussion of the regulation, see *supra* note 156 and accompanying text.

184. KAN. STAT. ANN. §§ 82a-1001 to -1019 (1969)(repealed by Act of March 17, 1972, ch. 386, § 17, 1972 Kan. Sess. Laws. 1430).

185. Peck, *Kansas Groundwater Management Districts*, 29 U. KAN. L. REV. 51, 52 (1980).

placed in 1972 by the current Groundwater Management Act (GMA).[186] Among its stated purposes are the conservation of groundwater resources, the prevention of economic deterioration and the stabilization of agriculture.[187] Within the framework of the WAA, the new statute establishes the right of local water users to determine their own "destiny" with respect to groundwater, through the creation of a local groundwater management district (GMD).[188] A GMD can be formed through a petition-filing process culminating in an election approving its organization.[189] All persons, both natural and corporate, who own at least forty contiguous acres within the district's borders but outside any municipality, or withdraw at least one acre foot of water per year from land within the district are eligible to vote in the organizational election and may participate in conducting the district's business.[190] Landowners who do not use water may opt out of a district; their land is not subject to assessments which finance the district.[191] The board of directors conducts the district's business.[192]

Analysis of the GMA.

To date, there are five GMDs; three overlie the Ogallala Aquifer, covering the vast majority of its Kansas portion (fig. II).[193] Pursuant to the Act each GMD has adopted a management plan,[194] approved by the Chief Engineer. Rules and regulations to enforce policies have also been adopted.[195] All regulations must be consistent with the WAA and approved by the Chief Engineer.[196] Under the GMA, the Chief Engineer ultimately decides whether to grant or deny a permit, but applications from within a GMD are reviewed first by the GMD for compliance with its criteria; a recommendation is then forwarded to the Chief Engineer.[197]

In two of the three GMDs overlying the Ogallala, district regulations are substantial. In GMD No. 3,[198] in southwestern Kansas, and

186. KAN. STAT. ANN. §§ 82a-1020 to -1035 (1984). For an overview of the Act, see Peck, *supra* note 185.

187. KAN. STAT. ANN. § 82a-1020 (1984).

188. *Id.*

189. *Id.* §§ 82a-1022 to -1025.

190. *Id.* § 82a-1021(e), (f), (k).

191. *Id.* §§ 82a-1021(e), (f), -1030.

192. *Id.* § 82a-1027.

193. Western Kansas GMD No. 1 is headquartered in Scott City; Southwest Kansas GMD No. 3 is headquartered in Garden City; Northwest Kansas GMD No. 4 is headquartered in Colby.

194. KAN. STAT. ANN. § 82a-1029 (1984).

195. KAN. ADMIN. REGS. § 5-21-1 to -21-3, 5-23-1 to -23-11, 524-1 to -24-7 (1983 & Supp. 1986).

196. GMDs promulgate and enforce their own policies; the Chief Engineer approves and enforces rules and regulations recommended by GMDs. KAN. STAT. ANN. § 82a-1028(n), (o) (1984). For a discussion of the distinction, see Peck, *supra* note 185, at 66-70.

197. *See* NORTHWEST KANSAS GROUNDWATER MANAGEMENT DIST. NO. 4, REVISED MANAGEMENT PLAN 14 (May 1, 1985).

198. In GMD No. 3 the distance between wells increases with the pumping rate. KAN. ADMIN.

GMD No. 4,[199] in northwestern Kansas, applicants must comply with both well spacing requirements and water use restrictions.[200] More to the point of this Article, they must also meet depletion standards. In GMD No. 3 an applicant must show that the sum of the proposed allotment, prior appropriations and earlier applications will not exceed a twenty-five year rate of depletion of forty percent of the saturated thickness underlying an area enclosed by a circle having a radius of two miles centered on the proposed new well.[201] In GMD No. 4 an applicant must show that the sum of all prior appropriations and earlier applications will not exceed an annual depletion rate of two percent of saturated thickness underlying an area enclosed by the same size circle.[202] This annual rate results in a forty percent depletion in twenty years.[203]

In one sense the depletion formulas are consistent with the WAA; the factors used to determine allowable appropriations correspond to the factors the Chief Engineer must evaluate in determining whether a requested appropriation is consistent with the public interest.[204] On the other hand, by allowing GMDs to place limits on appropriation, the legislature has significantly revised the WAA. The new restrictions in effect amend section 703, which mandates that "all waters may be appropriated," and redefine the public interest to include a conservation element.

Sadly, conservation that results from the depletion formulas is not the type that will significantly extend the aquifer's life. The regulations represent simply a policy of planned depletion; indeed, the regulation in GMD No. 4 is so captioned.[205] Put another way, while the regulations postpone the aquifer's ultimate demise, they also work to ensure its arrival in the near future.

It is true the formulas will ameliorate the effects of new irrigation; however, because the aquifer was substantially depleted before the regulations were issued, the allowable appropriations represent a larger share

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REGS. § 5-23-3 (Supp. 1986), and appropriations are limited to a maximum of two acre feet of water per acre of land. *Id.* § 5-23-5 (1983).

199. In GMD No. 4 the distance between wells increases with the number of acre feet of water requested, *id.* § 5-24-3, and appropriations are limited to (a) not more than 50% of the approved pumping rate of the well in gallons per minute or (b) an average of two acre feet per acre of land, whichever is less. *Id.* § 5-24-5.

200. GMD No. 1 also has spacing requirements; the distance between wells increases with the degree of aquifer depletion measured as of 1950. *Id.* § 5-21-3.

201. *Id.* § 5-23-4 (Supp. 1986).

202. *Id.* § 5-24-2.

203. Conversation with Wayne Bossert, Manager of GMD No. 4 (Sept. 8, 1985)[hereinafter Bossert Conversation].

204. *See supra* text accompanying notes 146-47. In GMD No. 3 the allowable annual appropriation is calculated using the following formula: $Q = 0.40(AMS)/25 + AR/12$ (Q = allowable annual appropriation, acre-feet per year; A = area of consideration, acres; M = average saturated thickness, feet; S = storage coefficient (specific yield); R = average annual recharge, and return flow from irrigation, inches per year). KAN. ADMIN. REGS. § 5-23-4 (Supp. 1986). In GMD No. 4 the formula is $Q = 0.02(AMS) + AR/12$ with the variables having the same designation. *Id.* § 5-24-2.

205. KAN. ADMIN. REGS. § 5-24-2 (Supp. 1986). The corresponding regulation in GMD No. 3 is entitled "Aquifer Depletion." *Id.* § 5-23-4.

of the total volume than is readily apparent.[206] Still, the formulas reflect a developmental ethic—albeit a less than full-scale one. They anticipate new development yet fail to address the Ogallala Aquifer's real crisis—the level of existing development caused by the WAA's presumption in favor of use.

I hasten to add that depletion formulas are a step in the right direction, and certainly the GMDs deserve praise for the conservation they have accomplished.[207] Moreover, it is somewhat unfair to criticize them for not going far enough; after all they work within a framework, however inappropriate, that generally views "use" as beneficial and "nonuse" as waste.[208] Once again, if we are to attain the goal of indefinitely sustaining dependable agriculture, we must reformulate that framework.

C. *The State Water Plan*

The third major component of Kansas water policy is the State Water Plan of 1985 (Plan). Although the legislature has not approved most provisions of the Plan,[209] it merits our attention as it indicates the direction in which water policy is headed. The Plan culminates efforts to initiate water planning that have persisted since 1895.[210] The Water Resource Planning Act of 1963 mandated its preparation.[211] That Act, as amended, declares: "The people of the state can best achieve the proper utilization and control of the water resources of the state through comprehensive planning which coordinates and provides guidance for the management, conservation and development of the state's water resources."[212]

The 1963 Act focused on issues of flood control and the storage of water in reservoirs; this focus has not been affected by subsequent amendments. Accordingly, it is not surprising that the Plan also emphasizes the development of water for municipal and industrial purposes. Nonetheless, the Act declares a long-range goal: the "sound manage-

206. For example, an area where the water level was down by 50% prior to the promulgation of the GMD No. 3 formula will actually be 70% depleted at the end of the 25-year period.

207. In particular, recent actions taken by GMD No. 4 constitute significant progress in this regard. *See infra* note 409 and text accompanying notes 409-16.

208. For discussion of the "unused water as waste" concept, see *supra* notes 157-59 and text accompanying note 158.

209. The Plan was drafted by the Kansas Water Office, which also retains responsibility for its continuous updating. KAN. STAT. ANN. § 82a-903 (1984). After public hearings, it was submitted to the Water Authority, which in turn submitted the Plan to the Governor and legislature. *Id.* § 82a-905. The Act provides that no portion of the Plan shall be effective until that portion has been approved by the legislature. *Id.* § 82a-906. The 1985 legislature failed to approve the Plan; over 50 implementational bills were introduced in 1986, but only a handful became law. *See* 1986 Kan. Sess. Laws 2033-68. Once the Plan is effective, inconsistent actions are prohibited and may be enjoined. KAN. STAT. ANN. § 82a-908 (1984).

210. *Re: Proposal No. 23—State Water Plan Development, reported in* REPORT ON KANSAS LEGISLATIVE INTERIM STUDIES TO THE 1985 LEGISLATURE 299 (1984).

211. KAN. STAT. ANN. § 82a-901 to -947 (1984).

212. *Id.* § 82a-901a.

ment" of the state's atmospheric, surface and groundwater, and the prevention of the waste of water.[213] It is unfortunate, therefore, that the Plan fails to take advantage of a seemingly perfect opportunity to mandate serious long-term conservation efforts. Its most glaring omissions occur in the context of the Ogallala Aquifer.

1. *Management and Development Sections*

The Plan is broken into five major divisions: Management; Development; Conservation; Quality; and Fish, Wildlife and Recreation. This Article considers the first three.

The Management Section is primarily devoted to reservoir policy. This section is generally irrelevant to western Kansas, due to the area's meager rainfall; the same is true of flood management subsections. The minimum desirable streamflow subsection narrowly focuses on streams in eastern and central Kansas, no doubt, for the same reason. Unfortunately, these policies, which have little to do with western Kansas, set the tone for and comprise the bulk of the Plan. The absence of concern for the problems of the Ogallala is even more conspicuous when the Development Section of the Plan is considered.

The Development Section divides the state into twelve river basins each constituting a basin planning area.[214] Each area has a basin advisory committee that develops a basin plan with input from public meetings; the basin plan is subject to the same review and enactment process as the Plan itself.[215] The Plan sets forth the general issues to be considered in each basin. And, as in the Management Section, a number of the development subsections dealing with the eastern and central Kansas basins make specific proposals for policies and projects aimed at ensuring the continued availability of adequate water supplies.

For example, the Lower Arkansas Basin subsection contains a discussion of the water needs of the City of Wichita prefaced with a statement of concern about the possible depletion of its groundwater reserves.

> The City of Wichita, the major water user in Sedgwick County, draws its water supply from the Equus Beds Aquifer and Cheney Lake. The yield limit of these two sources is projected to be reached as early as 1992. The water supply data for Sedgwick County indicate that municipal and industrial water supply needs through year 2035 could conceivably be met with present sources. However, to do so would significantly deplete groundwater sources, since necessary withdrawals would exceed natural recharge as early as year 2000. Therefore to

213. *Id.* § 82a-927. The 1986 legislature added an additional goal: "the protection of the public interest through the conservation of the water resources of the state in a technological and economically feasible manner." *Id.* § 82a-927(i) (Supp. 1986). One of the Act's desired policies for achieving its goals is the management of groundwater consistent with the WAA and the GMA. *Id.* § 82a-928.

214. KANSAS WATER OFFICE, KANSAS WATER PLAN, DEVELOPMENT SECTION, SUBSECTION: BASIN PLANNING (1985).

215. *Id.* at 3.

> avoid depletion of presently known groundwater supplies, it is necessary to consider water supply alternatives from additional sources to satisfy the projected year 2035 deficit of 53 MGD [million gallons per day].[216]

The Plan articulates a number of options:[217] the construction of a new reservoir (specific sites are evaluated); the construction of a pipeline to transfer water from Milford Lake; the treatment of lower quality water sources; and the implementation of a two-phase plan, the first stage requiring the construction of a moderately sized lake. Three of the four proposals specify yields that could be expected from the project; two discuss cost. The Plan concludes that currently there is not enough information available to make a recommendation, but it declares that "[b]ecause of the magnitude of this issue and the short time period until the deficits are projected to begin, this basin has a high priority for detailed planning."[218] The Plan contains similar, detailed statements of options, along with specific recommendations for dealing with projected water deficits for the City of Emporia,[219] Crawford and Cherokee Counties[220] and Ellis and Russell Counties.[221]

In stark contrast are the five development subsections of the Plan that cover the area overlying the Ogallala Aquifer.[222] First, unlike the Wichita proposal's dire projection that withdrawals will exceed natural recharge by the year 2000, none of the Ogallala basin subsections even mention the fact that withdrawals have been up to fourteen times greater than recharge for many years![223] Next, instead of detailed options like those spelled out to deal with urban water problems, the Ogallala subsections set forth agricultural water management policy statements, all in virtually the same remarkably nondescript language:

> MANAGEMENT OF AGRICULTURAL WATER SUPPLY DEFICITS.
>
> [The Plan states that the policy is addressed in the Management Section. Given that section's reservoir orientation, the statement seems mysterious.]
>
> Many counties in this basin share the common problem of likely deficits in agricultural water supplies for irrigation in the High Plains. Options
>
> 1. The first option is to do nothing. This option implies that irrigators would continue to exercise their water rights and their existing irrigation practices. If withdrawals of water continue at the present rate, it is estimated that it would no longer be economically feasible to irrigate after the year 2020.

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216. *Id.* SUBSECTION: LOWER ARKANSAS BASIN, at 5.
217. *Id.* at 5-6.
218. *Id.* at 6.
219. *Id.* SUBSECTION: NEOSHO BASIN, at 6.
220. *Id.* at 6-7.
221. *Id.* SUBSECTION: SMOKY HILL-SALINE BASIN, at 6.
222. *Id.* SUBSECTIONS: UPPER ARKANSAS, CIMARRON, UPPER REPUBLICAN, SMOKY HILL-SALINE AND SOLOMON BASINS.
223. *See supra* text accompanying note 48.

2. The second option is expansion of the boundaries of existing groundwater management districts. A groundwater management district would emphasize agricultural use efficiencies, and management practices which could significantly extend the 'economic life' of the groundwater supplies.

3. The third option is establishment of an organized research effort to evaluate new or alternate sources of supply. Possible areas of investigation for all applicable areas of the state include: weather modification, groundwater recharge, secondary recovery, use of Dakota aquifer,[224] treatment of lower quality sources and water importation from outside the state.

RECOMMENDED GUIDELINE

The recommended guideline is expansion of the groundwater management district and establishment of an organized research effort to evaluate new or alternate sources of supply.[225]

Compared to the previous urban proposals, the Ogallala sections seem at best halfhearted. One easily gets the impression that the Water Office considers urban water needs to be more important than agricultural water needs. Certainly it is not inappropriate to consider alternative sources of supply, although not surprisingly such a solution involves the further development of water rather than its conservation. And certainly expanding GMDs, at least those that have depletion formulas,[226] will slow the rate of consumption. Nevertheless, in recommending the expansion of GMDs the Water Office sidesteps the crisis on the Ogallala Aquifer—by assuming that GMDs are solving the problem.[227]

While the Water Office errs in failing to question this premise, in fairness to the planners, it is the underlying statutes that produce the misconception. The Water Resource Planning Act, which authorizes the Plan, sets up the trap that ensnares the Water Office. To implement the goal of a sound groundwater management policy, the Act declares the state should rely on the policies established by the WAA and GMA. In

224. The Dakota Aquifer would not be a reliable substitute for the Ogallala. It lies beneath the Ogallala and extends well east of it in the northern part of the state. (A line drawn between Washington County in north central Kansas, and Clark County in the southwest, would approximate the Dakota's eastern boundary.) The surface of the Dakota water table ranges from about 400 feet below ground in southwest Kansas to about 1000 feet in northwest Kansas; its saturated thickness ranges from almost zero in the southwest to 200-300 feet in the northwest. The quality of its water deteriorates in its northwestern sections, where in some places it has been deemed unfit for irrigation purposes. Some costs of developing the Dakota would be greater than those required to develop the Ogallala have been; other costs would be comparable. Because the Dakota lies deeper, drilling costs would be greater. However, unlike the Ogallala, the Dakota is artesian, and internal pressure would force water up to the Ogallala's approximate level, thereby equalizing pumping costs. But the Dakota could not be developed as heavily as the Ogallala has been. Because of the artesian pressure, a well drilled in the Dakota would impair other Dakota wells in a much larger area, approximately two miles in all directions. A well drilled in the Ogallala by contrast has little impact beyond 2300-2800 feet. Conversation with Mike Dealy, Manager of GMD No. 2 (Sept. 9, 1986).

225. KANSAS WATER OFFICE, KANSAS WATER PLAN, DEVELOPMENT SECTION, SUBSECTION: UPPER ARKANSAS BASIN 5. All five Ogallala subsections point to the year 2020 as the estimated date when irrigation will no longer be economically feasible. *Id.*

226. For discussion of GMD depletion formulas, see *supra* text accompanying notes 198-208.

227. For discussion of conservation associated with depletion formulas, see *supra* text accompanying notes 198-208.

other words, the Planning Act perpetuates the illusion that GMDs adequately conserve water. The Act fails to acknowledge that, despite their restrictions on new irrigation, GMDs embody a policy of planned depletion that ultimately stems from the WAA policy favoring all-out development. Because we are unwilling to examine that fundamental policy, it is not suprising that the Plan treats groundwater management so halfheartedly.

2. *Conservation Section*

On a somewhat more positive note, the Plan does begin to address water conservation issues. Regrettably, however, the discussion occurs in only three subsections: agricultural, municipal and industrial conservation. Once again we see that the Plan as a whole is far more concerned with development than with conservation.

The agricultural conservation subsection defines two types of water loss, recoverable and nonrecoverable.[228] Recoverable losses, such as those that can be diminished through the use of tailwater pits,[229] are minor compared to nonrecoverable losses which occur primarily through evaporation and transpiration. Evaporation losses are generated largely by sprinkler systems, such as center pivots,[230] while transpiration losses occur when broad-leafed crops such as corn are grown in arid climates.[231] Together, these nonrecoverable loss factors account for sixty to eighty percent of total agricultural water use![232] Accordingly, the Plan declares: "Even a small improvement in water losses to evaporation and/or transpiration may represent a more substantial reduction in total water use than a relatively large reduction in recoverable water losses."[233]

a. *Conservation Planning*

To reduce water losses, the Plan recommends the use of water conservation planning. Under such a program irrigators would conserve water by considering and then implementing water-saving techniques such as modernization of equipment, improved efficiency of application and the cultivation of less water consumptive crops.[234] However, the Plan rejects a mandatory planning requirement for all irrigators, reason-

228. KANSAS WATER OFFICE, KANSAS WATER PLAN, CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION 2-3 (1985).

229. *See supra* text accompanying notes 174-75.

230. *See supra* text accompanying note 175.

231. *See supra* note 24 and accompanying text.

232. KANSAS WATER OFFICE, KANSAS WATER PLAN, CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION 3 (1985).

233. *Id.*

234. The plans would be similar to those now required of some irrigators in GMD No. 4. *See infra* text accompanying notes 409-16. For additional discussion of plan preparation, see *infra* text accompanying notes 395-96.

ing that there exists variation in the need for planning, and that an across-the-board requirement could lead to excessive administrative burdens and costs.[235] Instead, the Plan recommends the legislature empower the Chief Engineer to require conservation plans only on a case-by-case basis and in situations which the basin planning process[236] identifies as requiring such action.[237] Although the recommendation signifies a willingness to understand the importance of conservation, case-by-case planning represents only a band-aid type solution, and permitting basin advisory committees to propose planning requirements represents an indirect approach. Furthermore, unlike the reasoning behind the previously discussed development statements, the reasons given to support limited conservation planning are not easily attributable to mistaken illusions contained in the current water code.[238]

In recommending the Chief Engineer be given this limited authority, the Water Office, which drafted the Plan, implicitly acknowledges that existing irrigators should be required to conserve water. But instead of taking the next logical step—advocating a broad-based declaration to that effect—it contrives a reason to avoid taking such a stand. The Water Office treats existing water acts as merely *regulatory* mechanisms, and takes the position that any *policy* proposals, such as mandatory conservation planning, should come from basin advisory committees.[239] This distinction is of course artificial; it also ignores the current water code's prodevelopment policies which have brought us to the point that planning is necessary. There is no question that basin advisory committees provide valuable input; nonetheless it appears the Water Office is engaged in buck-passing, demonstrating its unwillingness to confront groundwater conservation issues seriously.

This conclusion becomes more apparent when the above recommendations are compared to those dealing with the marketing of state controlled surface water stored in federal reservoirs. Under existing statutes, stored water can be sold only for municipal and industrial purposes.[240] However, the Plan recommends legislation that would permit cities and industries to sell unused water for short-term irrigation purposes, during dry periods.[241] But before purchasing water for this purpose, a farmer would be *required* to have a conservation plan approved by the Chief

235. KANSAS WATER OFFICE, KANSAS WATER PLAN, CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION 3-4 (1985).

236. For discussion of basin planning, see *supra* text accompanying notes 214-15.

237. KANSAS WATER OFFICE, KANSAS WATER PLAN, CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION 4 (1985).

238. *See supra* text accompanying notes 226-27.

239. Conversation with Tom Lowe, the Water Office official who coordinated the preparation of the State Water Plan (Jan. 14, 1986)[hereinafter Lowe Conversation].

240. KAN. STAT. ANN. §§ 82a-1301 to -1320 (1984).

241. KANSAS WATER OFFICE, KANSAS WATER PLAN, MANAGEMENT SECTION, SUBSECTION: WATER MARKETING 3 (1985).

Engineer.[242]

The Plan articulates why conservation planning is important in the water marketing context by referring to its introductory statement that serves as the rationale for giving the Chief Engineer case-by-case authority to require plans, namely that reductions in evaporation or transpiration losses will save more water than reductions in recoverable losses.[243] It then adds, "The merits of preparing conservation plans apply in this [water marketing] situation as well."[244] If the underlying rationales are the same, why are plans required in one context but not in the other? The answer is not revealed, but can be inferred from the reasons given for rejecting mandatory planning for existing irrigators, namely that reviewing their conservation plans would be administratively more cumbersome than reviewing the plans of water purchasers. One of the Water Office officials primarily responsible for the Plan has confirmed this supposition.[245]

To be sure, plans from the first group would outnumber those from the second, and the Chief Engineer would be responsible for final approval. But in the Ogallala region the burden would not be as great as it might seem. The Plan provides for the promulgation of planning guidelines by the Kansas Water Office;[246] subsequently, initial review could be conducted by the appropriate GMD. The GMD's report would be forwarded to the Chief Engineer as are its recommendations on permit applications.[247] Moreover, borrowing a page from the Plan's proposal for voluntary metering, discussed below, compliance deadlines could be staggered over a period of time.[248]

Failure to consider these options can be explained by contemplating the Plan's statement, reiterated and emphasized orally to me, that there exist areas where conservation planning is simply not needed.[249] This assertion demonstrates the Water Office is unwilling to acknowledge the problems of the Ogallala in a realistic way. Even if there are some areas of the state where planning is not needed, by definition they cannot include the area overlying the Ogallala—a nonrechargeable aquifer. Whether the failure to acknowledge this fact stems from the illusion that GMDs are solving the problem, or from an unwillingness to confront courageously the special problem of the Ogallala, the Water Office has

242. *Id.* CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION, at 4.

243. *Id.* at 4. For the exact statement, see *supra* text accompanying note 233.

244. KANSAS WATER OFFICE, KANSAS WATER PLAN, CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION 4 (1985).

245. Lowe Conversation, *supra* note 239.

246. KANSAS WATER OFFICE, KANSAS WATER PLAN, CONSERVATION SECTION, SUBSECTION: AGRICULTURAL WATER CONSERVATION 4 (1985).

247. *See supra* text accompanying note 197.

248. *See infra* text accompanying note 267.

249. Lowe Conversation, *supra* note 239.