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Groundwater: From Windmills to Comprehensive Public Management

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GROUNDWATER: FROM WINDMILLS TO COMPREHENSIVE PUBLIC MANAGEMENT

Richard S. Harnsberger, Jarret C. Oeltjen,** Ralph J. Fischer****

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I. PREFACE

The Nebraska Legislature in 1963 directed the Nebraska Soil and Water Conservation Commission, now the Nebraska Natural Resources Commission, to "plan, develop, and encourage the implementing of a comprehensive program of resource development, conservation, and utilization for the soil and water resources of this state"¹ The 1967 legislature unanimously endorsed Legislative Resolution No. 5 requiring development of a State Water Plan by the Natural Resources Commission.² The resolution states: "That this State Water Plan, [in] addition to an evaluation of the land and water resources, will also include an examination of legal, social and economic factors which are associated with resource development."³

The Commission encouraged the authors to complete an independent study, but this article is not the official view of the Commission and may even contradict its future decisions. The article is the second of three analyzing legal aspects of water resource planning in Nebraska. The first, entitled *Interbasin Transfers: Nebraska Law and Legend*,⁴ was published in the *Nebraska Law Review* last year. This article will describe groundwater utilization in Nebraska and analyze some of its major problems. Despite increasing conflict between users, subterranean withdrawals have never been managed other than by the individual decisions of thousands of farm irrigators and domestic, industrial and municipal users. This contrasts sharply with the comprehensive scheme regulating stream diversions since 1895 which will be the focus of the last study in this series.

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1. Neb. Laws c. 8, § 3 (1963), now NEB. REV. STAT. § 2-1507(7) (Reissue 1970).
 2. 1967 Neb. Leg. Jnl. 122-23, 163 (adopted 77th Neb. Leg. Sess., Jan. 18, 1967). The resolution authorized the Nebraska Soil and Water Conservation Comm'n to develop the water plan; the commission's name was changed to the Nebraska Natural Resources Comm'n in 1972.
 3. *Id.* at 122.
 4. Oeltjen, Harnsberger & Fischer, *Interbasin Transfers: Nebraska Law and Legend*, 51 NEB. L. REV. 87 (1971).

II. INTRODUCTION

Ground and stream diverters in Nebraska are on a collision course which may occur sooner than most people think. For instance, approximately one million acres in Nebraska are irrigated from natural streams and another three million are irrigated from wells. Three-fourths of the total four million acres were irrigated within the past two decades and an estimated nineteen million acres are suitable for irrigation but are undeveloped.¹ Of this potential irrigable acreage, eleven million are moderately to well

SHORT CITATIONS

The following shortened citation forms are used for articles, books and treatises which are frequently cited:

- CLARK — WATERS AND WATER RIGHTS (R. Clark ed.). This is a comprehensive multi-volume treatise; the dates for the volumes published to date are: 1, 1967; 2, 1967; 3, 1967; 4, 1970; 5, 1972; 6, 1972.
- CORKER — C. CORKER, GROUNDWATER LAW, MANAGEMENT AND ADMINISTRATION (Legal Study No. 6, Nat'l. Water Comm'n, Oct. 1961).
- ELLIS — ELLIS, *Water Rights: What They Are and How They Are Created*, 13 ROCKY MT. MINERAL L. INST. 451 (1967).
- FRAMEWORK STUDY — NEBRASKA SOIL AND WATER CONSERVATION COMM'N, REPORT ON THE FRAMEWORK STUDY (State Water Plan Pub. No. 101, May 1971).
- HANKS — HANKS & HANKS, *The Law of Water in New Jersey: Groundwater*, 24 RUTGERS L. REV. 621 (1970).
- HARNSBERGER — HARNSBERGER, *Nebraska Groundwater Problems*, 42 NEB. L. REV. 721 (1963).
- HINES — N. HINES, A DECADE OF EXPERIENCE UNDER THE IOWA WATER PERMIT SYSTEM (U. of Iowa Agricultural Law Center Monograph No. 9, Sept. 1966).
- HUTCHINS — W. HUTCHINS, THE CALIFORNIA LAW OF WATER RIGHTS (1956).
- MEYERS & TARLOCK — C. MEYERS AND A. TARLOCK, WATER RESOURCES MANAGEMENT (1971).
- MODEL WATER USE ACT — NAT'L. CONFERENCE OF COMM'RS ON UNIFORM STATE LAWS, MODEL WATER USE ACT (1958).
- PROCEEDINGS — THE ANNUAL PROCEEDINGS OF THE NEBRASKA STATE IRRIGATION ASS'N.
- TRELEASE-WIS. — J. BEUSCHER, F. CLARENBACH, & F. TRELEASE, LEGAL AND ECONOMIC ASPECTS OF WATER RIGHTS IN MINNESOTA, WISCONSIN, INDIANA AND OHIO: EVALUATIONS OF FINDINGS (Review Draft, Phase Rep. No. 22, Contract No. 12-14-100-1010(43) between the U. of Wis. and the U.S. Dep't. of Agriculture, Beuscher & Ellis eds., 1961).
- WIDMAN — WIDMAN, *Groundwater—Hydrology and the Problem of Competing Well Owners*, 4 ROCKY MT. MINERAL L. INST. 523 (1968).
- YEUTTER — YEUTTER, *A Legal-Economic Critique of Nebraska Watercourse Law*, 44 NEB. L. REV. 11 (1965).
1. Hamon, *Nebraska's State Water Plan*, in PROCEEDINGS OF THE NEBRASKA WATER RESOURCES AND IRRIGATION DEVELOPMENT SEMINAR FOR THE 70'S, E-1, E-6 (U. of Neb., Lincoln, March 2-3, 1972). As might be expected, estimates of land irrigated vary considerably. See *id.* at C-2, E-5 and Table I opposite F-6.

suited for irrigation. The largest area for new development is the 20,000 square mile Sandhills region in north central, central and western Nebraska.

It has been estimated that irrigation and associated practices increase the net income to an owner-operator by approximately 100 percent.² With this type of return on investment, expansion will continue rapidly unless slowed by either physical or legal restrictions.

To perceive the complexity of legal regulations in the field of groundwater management, an elementary concept of the hydrologic cycle is necessary.³ First, all water is interrelated and interdependent. If groundwater were red, most streams would be various shades of pink; if groundwater were poisoned, the streams would also be poisoned.⁴ The reservoirs in the Sandhills are illustrative. They keep the streams, especially the Elkhorn River, flowing even when no precipitation falls. Thus municipalities in eastern Nebraska are vitally concerned with any irrigation expansion in the Sandhills since they depend upon these streams and the Platte River to recharge well fields. This shows the paradox of carefully allocating and administering streams while the groundwater resources which affect their flow are ignored.

Also, groundwater management takes effect slower than regulation of streams. This is because groundwater usually moves snail-like and pumping from wells does little to speed its lateral flow. In Nebraska, groundwater percolates slowly, generally not more than several feet each day and in most instances only about 300 feet annually. At a velocity of 300 feet per year, water moves only one mile in seventeen years. In contrast, streamflow down the Platte River moves at approximately twenty-five miles per day. As a result, when junior headgates are closed at the western border of the state, water arrives west of Kearney in about ten days.⁵ The negligible movement of groundwater is the main reason why it is

2. K. GERTEL, N. THOMAS, T. THORFINNSON & H. OTTOSON, ADJUSTING TO IRRIGATION IN THE LOUP RIVER AREA IN NEBRASKA 53 (U. of Neb. College of Ag. Bull. No. 434, Feb. 1956).

3. See Crosby, *A Layman's Guide to Groundwater Hydrology*, in CORKER at 37-97. See also *Selected References*, *id.* at VIII-359-60; MEYERS & TARLOCK at 553-66; Widman at 523.

4. CORKER at i and I-267.

5. See *State ex rel. Cary v. Cochran*, 138 Neb. 163, 292 N.W. 239 (1940). Because this decision is cited so frequently in casebooks and texts, it should be observed that Lake McConaughy's storage availability now allows natural flow rights to ride the storage water "piggyback" down the Platte River. Technology has solved this case's problem, and high priority irrigators—for instance those on the Kearney Canal—now receive undiminished appropriations.

seldom feasible to close junior wells under an appropriation system to get water to senior wells.⁶ Rather, management usually regulates all withdrawals to maintain minimum water levels in reservoirs.

Any management proposal should encourage optimum use and orderly development of groundwater so that both users and the state-wide community obtain maximum economic and social returns. Overall management includes deciding how much water can safely be removed from storage. This may necessitate prohibiting pumping below a certain level. Making such determinations is complicated, but groundwater is no longer a hidden, secret resource; electric-analog, digital and mathematical models which have become common hydrogeologic management tools, can forecast long-term effects of probable withdrawals and recharge.

Management techniques protect vested rights of present users, especially those who have expended large sums for well installations and irrigation equipment. The Supreme Court of Arizona summarized the issue in *Southwest Engineering Co. v. Ernst*⁷ as follows:

We are of the opinion that there is a preponderant public concern in the preservation of the lands presently in cultivation as against land potentially reclaimable, and that where as here the choice is unavoidable because a supply of water is not available for both, we cannot say that the exercise of such choice, controlled by considerations of social policy which are not unreasonable, involves a denial of due process.⁸

Future, as well as existing, rights should be protected. Municipalities, industrial concerns and irrigators must be able to approximate costs before making investments, *i.e.*, entrepreneurs must know what water is available for prospective needs. A sound management plan would substantially promote that objective while more adequately guarding the public interest in groundwater regulation.

To prepare a plan for groundwater management, the legislature with help from administrative agencies is better equipped than the courts to evaluate empirical data and make necessary value judgments. We believe not only that the burden is legislative, not judicial, but also that a greater sense of urgency is essential.

The history of groundwater in Nebraska and the associated legal problems are not neatly compartmentalized into time spans, but we

6. Ellis at 470.

7. 79 Ariz. 403, 291 P.2d 764 (1955).

8. *Id.* at 410, 291 P.2d at 769.

have designated the following three periods for a framework: territorial days to 1920, 1920 to 1950, and 1950 to present.

III. THE FIRST PERIOD—TERRITORIAL DAYS TO 1920

When Nebraska was organized as a territory on May 30, 1854, the only settlement consisted of about fifty inhabitants located near Peter Sarpy's trading post at Bellevue.⁹ The total population was 2,732, with 1,818 persons living south of the Platte River and 914 persons living north.¹⁰ Two years later the population was 10,716. By 1860 it had grown to 28,841, and much of the land, which now averaged 8.26 dollars per acre,¹¹ had been claimed. At the time of statehood in 1867, Nebraska had 50,000 people, many of whom had begun to move westward from the Missouri River in an irregular line from Columbus to Fairbury in the Platte River Valley. On the north, the Valley was settled to Grand Island.¹²

Growth thereafter was rapid as a result of campaigns by particular nationalities to bring friends and relatives from the old country, the commitment to a free land policy by settlers in the West and newspaper promotions in the East. Another important stimulant to both recruitment of immigrants and economic growth in Nebraska was construction of the Union Pacific Railway between 1865 and 1869.¹³ Groundwater played an important part in the westward extension of the railroads. Every right-of-way had a series of installations where the steam engines took on water drawn from wells by immense windmills with wheels ranging from sixteen to thirty feet in diameter.¹⁴

The windmill also helped the settlers directly. In the East, water could be raised by hand from shallow and easily dug wells. This, however, was not the situation in Nebraska where well capa-

9. See J. OLSON, *HISTORY OF NEBRASKA* 83 (1955). For Mari Sandoz' description of Nebraska in 1854, see Sandoz, *The Look of the West—1854*, 35 *NEBRASKA HISTORY* 243 (1954).

10. Nebraska Advertiser (Brownville), June 7, 1856, in Richardson, *The Nebraska Prairies: Dilemma to Early Territorial Farmers*, 50 *NEBRASKA HISTORY* 359, 361 (1969):

There are over 2000 inhabitants, mostly tillers of the soil. Here, our cattle roam at large, and become fat and sleek upon the prairie grass and wild pea, abounding in this region. Butter is of excellent flavor.

11. Socolofsky, *Land Disposal in Nebraska, 1854-1906; The Homestead Story*, 48 *NEBRASKA HISTORY* 225, 229 (1967).

12. J. OLSON, *HISTORY OF NEBRASKA* 93-94 (1955).

13. See Combs, *The Union Pacific Railroad and the Early Settlement of Nebraska 1868-1880*, 50 *NEBRASKA HISTORY* 1 (1969).

14. See Dick, *Water, A Frontier Problem*, 49 *NEBRASKA HISTORY* 215, 241 (1968) [hereinafter cited as Dick].

city was often small and water had to be lifted from great depths to fulfill the settlers' needs.¹⁵ Walter Prescott Webb observed in his classic study:

There was need in the Great Plains for some mechanical device that would raise water to the surface, one that would be economical in construction, inexpensive in operation, and capable of making slow but constant delivery in order to raise as much of the precious fluid as was available.¹⁶

The device of course, was the windmill. Without it the early settlers could have located only by natural watercourses, thus leaving vast areas of uplands unoccupied for years.¹⁷

Professor E.H. Barbour, the distinguished University of Nebraska geologist, wrote that Nebraska

seems to be the heart and center of the windmill movement. The famous Platte Valley, with its broad expanse and shallow wells, is a veritable windmill area. From Omaha west through the state, a distance of 500 miles, and even beyond to Denver, there is a constant succession of these creations of a sturdy population.¹⁸

Before 1920, there was little well irrigation in the state.¹⁹ The foundation of the early agricultural economy was dry land farming, *i.e.*, employment of special techniques to raise crops where moisture was insufficient. Nebraska was the center of the dry-farming

15. Eide, *Free as the Wind*, 51 NEBRASKA HISTORY 25, 31 (1970). In the Lower Platte River Valley, water could be reached from eight to twenty feet deep. Upland farmers, however, needed deep wells, and wells as deep as 100 feet or more were not unusual. In the Valentine area during the 1880's and 1890's, a well digger in seven years "dug more than six thousand feet of wells ranging from one hundred to two hundred and sixty feet in depth." Dick, *supra* note 14, at 229.

16. W. WEBB, *THE GREAT PLAINS* 336 (1931).

17. Nebraska Farmer, III, No. 10, Oct. 1879, at 238, in Dick, *supra* note 14, at 241:

[R]ight here we wish to say in behalf of windmills, that no man can afford to give the land that is wasted by a stream of water. Either one of the above mentioned mills are worth more than any stream of water. But a few years since, the first question asked by a man buying land, was: "Is there a stream of water on the farm?" But that time is fast passing away, and those that have the stream of water pay very little attention to it, more than to build bridges across it, or wishing it was on some other man's farm.

18. BARBOUR, *WELLS AND WINDMILLS IN NEBRASKA*, U.S. GEOL. SURVEY WATER SUPPLY AND IRRIGATION PAPER No. 29, H.R. DOC. No. 299, 55th Cong., 3d Sess. 35 (1899).

19. Address by George E. Johnson, chief engineer, Central Nebraska Public Power & Irrig. Dist., in *PROCEEDINGS* at 20 (December 1954). In 1930, pump irrigation statistics were first included in *Nebraska Irrigation Statistics* and *Nebraska Agricultural Statistics*. These listed 946 wells in Buffalo, Dawson and Hall counties in South-Central Nebraska. NEBRASKA AGRICULTURAL STATISTICS 19 (1930).

movement as evidenced by Hardy W. Campbell, originator of the Campbell method of dry-land agriculture, having done most of his work in the state.²⁰ Nevertheless, small plots were irrigated with groundwater in the early days. This irrigation was critical because the produce from two to five acres, even though usually worth less than 100 dollars, enabled some homesteaders to remain when others starved out.²¹ No records exist of the numbers who abandoned their farms and deserted the region when rainfall was negligible. Those with well irrigation, however, remained. Their living conditions have been vividly depicted by Frederick H. Newell, Chief Hydrographer for the United States Geological Survey, as follows:

The grasses wither, the herds wander wearily over the plains in search of water holes, the crops wilt and languish, yielding not even the seed for another Another and perhaps another season of drought occurs, the settlers depart with such of their household furniture as can be drawn away by enfeebled draft animals, the herds disappear, and this beautiful land, once so fruitful, is now dry and brown and given over to the prairie wolf.²²

In conclusion, before 1920 irrigation from wells was infinitesimal. Except for disputes over pollution of the water supply, there were no conflicts between users.²³ The main contributions of groundwater in the early period were aiding westward extension of the railroads, encouraging settlement of otherwise uninhabited large areas away from streams and providing irrigation for large gardens which supplied crops for subsistence during droughts.

IV. THE SECOND PERIOD—THE IMPETUS FOR CHANGE EMERGES IN THE 20's, 30's AND 40's

Although a few farsighted men recognized the potential of underground water at an early date,²⁴ a number of people attending

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20. See H. CAMPBELL, 1902 SOIL CULTURE MANUAL (1902). This 110-page pamphlet explains how rain waters are conserved in the soil and how capillary attraction, percolation and evaporation may be regulated by cultivation. See also W. WEBB, THE GREAT PLAINS 366-74 (1931).
 21. W. WEBB, THE GREAT PLAINS 346 (1931). See also Sageser, *Windmill and Pump Irrigation on the Great Plains 1890-1910*, 48 NEBRASKA HISTORY, 107, 108 (1967).
 22. Newell, *Irrigation on the Great Plains*, in THE YEARBOOK OF AGRICULTURE 168-69 (1896), cited in W. WEBB, THE GREAT PLAINS 343-44 (1931).
 23. E.g., *Lowe v. Prospect Hill Cemetery Ass'n*, 58 Neb. 94, 78 N.W. 488 (1899); *Anheuser-Busch Brewing Ass'n v. Peterson*, 41 Neb. 897, 60 N.W. 373 (1894); *Beatrice Gas Co. v. Thomas*, 41 Neb. 662, 59 N.W. 925 (1894).
 24. E.g., address by George Heed, in PROCEEDINGS at 168 (1896); address by George E. Johnson, in PROCEEDINGS at 194 (1920); address by

the 1929 meeting of the Nebraska State Irrigation Association thought it inappropriate when the Buffalo County Agent discussed pump irrigation in the Kearney area.²⁵ This attitude was not unusual for a state where only 39,000 acres were irrigated with groundwater. Yet changes were taking place which eventually would cause an almost unprecedented growth in the use of underground water. The changes occurring in the 1920's, 30's and 40's need not be described with particularity. The main currents of the transition, however, are noteworthy because of the effect they had on the people, the economy and ultimately on the utilization of subterranean water.

A. MECHANIZATION AND ELECTRIFICATION

By 1920, mechanization of American farms was underway. The pace of the change is frequently forgotten, however, and some statistics may be helpful in appreciating the increasing mechanization. The pace nationally is illustrated by the growth in the use of tractors. In 1910, only 1,000 tractors were in use. By 1920 the number had passed 200,000; by 1930, 920,000; by 1940, 1,545,000.²⁶ At the same time, the use of other machinery increased, as the following chart illustrates:

	1930	1940	1950
Grain combines	61,000	190,000	714,000
Corn pickers	50,000	110,000	456,000
Farm trucks	900,000	1,047,000	2,207,000 ²⁷

Adjustment to the change was the subject of a lively discussion in 1930 when the Nebraska State Irrigation Association held its thirty-eighth annual convention in Grand Island. A delegate from Gering asked a speaker how he would compare horse farming with tractor farming. The reply was hedged: "I don't know whether tractor farming or horse farming is best. Either one might be best under certain conditions." The president of the association then commented:

It is a good thing to take into consideration . . . growing boys if you have them, and see what the boys think about it, for if you

Willard D. Johnson, in *PROCEEDINGS* at 73 (1897); address by Professor O.W. Sjorgern in 1915, in *PROCEEDINGS* at 190 (1920).

25. See *PROCEEDINGS* at 16 (1929).

26. BUREAU OF THE CENSUS, *HISTORICAL STATISTICS OF THE UNITED STATES—COLONIAL TIMES TO 1957* at 284-85 (1960).

27. *Id.* The number of horses on Nebraska farms also declined dramatically. There were 1,001,000 horses in 1909. Between 1912 and 1919, the number of horses remained relatively steady at 1,050,000, but thereafter decreased steadily.

want to keep them there on the farm you are going to have to see what the boys think, and you may have to use tractors for that reason.²⁸

Coincident with the mechanization of farms was their electrification. In 1920, only 1.6 percent of all farms in the United States had electric power. The percentage in Nebraska by 1929 was only 5.8 compared to 9.2 nationally. A state-wide public power system was developed during the 30's and on the national level the Rural Electrification Administration was created by executive order in May 1935. By 1950, seventy-eight percent of the 107,183 farms in Nebraska were supplied with electricity. This percentage equaled that of the nation. In *The Big Change*, Frederick Lewis Allen wrote:

A one-time resident of Arkansas, returning to Fayetteville at the mid-century after a prolonged absence, remarked that the most eye-opening thing about the farms he saw in the neighborhood was that almost all were electrified; in his boyhood an electric-lighted farm had been a rarity. At about the same time the editors of a popular magazine planned to publish a picture story on the daily routine of a farmer's wife; they abandoned the project because the farmers' wives . . . had so much mechanical kitchen equipment that they could hardly be distinguished photographically from other housewives.²⁹

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28. PROCEEDINGS 11 (1930). A delegate from Western Nebraska concluded the meeting with the following "economic" evaluation:

I would like to say a word further on that question. It looks to me like a plainly foolish proposition for a farmer to buy feed when he has it at home. When you use a tractor you must pay out money for John Deere and then patronize the oil outfits to buy feed for the tractor. But the horses can consume the feed that is already on the farm; they keep that much corn and other feeds off the market. I think that is one of the great leaks in our industry today, the farmers buying the feed for all of these tractors. Of course, an automobile is different, you need one of those. We are going to have them anyway, but we surely can get along without so many tractors. We have one on our place, we didn't have any for a long time, but we seem to need one for breaking out the land, plowing work more quickly, but if we didn't have use for the tractor in that respect we wouldn't, but I think trying to stack hay with a tractor looks quite ridiculous.

Id. at 12.

29. F. ALLEN, *THE BIG CHANGE* 168 (1961).
30. Statistics for this chart are in *Nebraska Blue Books*. By 1970, there were about half as many farms in Nebraska as in 1934. The average size in 1970 was 659 acres compared to 418 in 1960, an increase of 27%. In 1960, there were an estimated 93,000 farms in Nebraska compared to 73,000 in 1970. *Lincoln Journal*, March 27, 1971, at 5, col. 1. See also *Omaha World-Herald*, Jan. 11, 1970, § J at 1-3. See generally Bickel, *Revolutions in American Agriculture*, MONTHLY REVIEW 3 (Fed. Reserve Bank of Kansas City, June 1972).

Electrification and mechanization reduced the necessity for farm laborers and started the trend towards fewer larger sized farms in Nebraska as shown by the following chart:

	1930	1935	1940	1945	1950
Farm acreage (000 acres)	44,709	46,616	47,344	47,753	47,467
Number of farms	129,458	133,616	121,062	111,756	107,183
Average acreage per farm	345.4	348.9	391.1	427.3	442.9 ³⁰

B. DROUGHT AND DEPRESSION

Another cause of the decrease in farm population was the disastrous drought of the 1930's. From 1931 to 1940 Nebraska suffered from the most severe drought of record.³¹ Only once, in 1938, was the amount of precipitation during the ten year period above the mean, and total rainfall deficiency was 45.2 inches. This, together with a nation-wide depression, was ruinous.

Between 1929 and 1934 agricultural production declined fifteen percent in volume and forty percent in price, while realized net income was less than a third what it had been in 1929.³² By 1932 corn was thirteen cents a bushel, wheat twenty-seven cents a bushel and eggs were nine to twelve cents per dozen. By 1936 the state had dropped nationally from third to eighteenth place in production of corn, from second to fifth in wheat and from second to seventh in alfalfa. In January of 1937 one of every six Nebraska farm families was receiving a grant for relief, but the ratio was only one in twenty-five in Scotts Bluff County where there was a stabilized economy largely due to irrigation from the North Platte project.³³ The drought and depression were so severe and protracted that many people left the state. Between 1930 and 1940 the number of people decreased almost five percent; in contrast, from 1920 to 1930 population had increased 6.3 percent. Furthermore, from 1930 to 1950, the ratio of rural farm population to total population decreased from forty-two to twenty-nine percent.³⁴

31. See M. LAWSON, A. RIESS, R. PHILLIPS & K. LIVINGTON, *NEBRASKA DROUGHTS: A STUDY OF THEIR LAST CHRONOLOGICAL AND SPATIAL EXTENT WITH IMPLICATIONS FOR THE FUTURE* 6-7, 74 (Dep't of Geography Occasional Paper No. 1, U. of Neb. 1971).

32. See A. SCHLESINGER, JR., *THE COMING OF THE NEW DEAL* 27 (1959), *THE CRISIS OF THE OLD ORDER* 174 (1957).

33. *PROCEEDINGS* at 63 (1969).

34. In 1930, total population was 1,377,963; rural farm was 582,981. In 1950, total population was 1,325,510; rural farm was 391,435. *NEBRASKA BLUEBOOK* 564 (1960).

C. PROFITABILITY OF IRRIGATION

By 1930 reports of increased production from irrigation were commonplace. In December a report was made at the annual meeting of the Nebraska State Irrigation Association which showed the following increased yields in Buffalo County as a result of pump irrigation:

	With irrigation	Without irrigation
Corn	60 bushels	25 bushels
Potatoes	200 bushels	90 bushels
Sugar beets	12 tons	6 tons

With an average cost of 1,000 dollars for constructing a well and buying equipment, farmers found it economical to irrigate. Six firms located at Kearney, in Buffalo County, were installing wells in 1930 and two companies were manufacturing pumps.³⁵

D. KNOWLEDGE ABOUT GROUNDWATER SOURCES

Another impetus to development was the commitment which state and national government made to underwriting research in groundwater. In 1930 a cooperative program of groundwater investigation was started by the Conservation and Survey Division of the University of Nebraska and the Groundwater Branch of the United States Geological Survey. This development of sophisticated data on a state-wide basis, together with educational programs and periodic reports to the Irrigation Association, made considerable information available and called attention to the importance of groundwater. When potential users knew the location and available amounts of groundwater the tempo of well installation rose. The first large increase came in 1940 when 1,500 wells were installed making a total of 3,050 wells irrigating 183,000 acres. Again the economic results were impressive. After eight years of irrigation in Phelps County, from 1942 to 1950, population increased eleven percent, acres irrigated grew from zero to 54,000, crop income rose five million dollars, bank deposits eight million dollars, assessed valuation eight million dollars, and the value of farm machinery advanced from 524,000 dollars to 1,544,000 dollars.³⁶

Once this knowledge of the profitability and sources of groundwater combined with the recent technology and cheap electric

35. PROCEEDINGS at 42-43 (1930). See also R. WILLIS, OUTLINE-HISTORY OF IRRIGATION IN NEBRASKA—HISTORICAL AND INFORMATIONAL ARTICLES 7 (Neb. Div. of Administration 1950-51).

36. PROCEEDINGS at 9-10 (1950).

power,³⁷ a new attitude developed about investing in irrigation installations. Larger farm units further enhanced interest in irrigation by making it worthwhile to develop better well construction techniques, new drilling machinery for deeper wells,³⁸ the modern turbine pump, the automatically controlled electric motor, and light-weight corrosion-free, low-price pipe. The cost of the continually expanding development was within the means of individual farmers, and by 1950, 448,500 acres were being irrigated from 7,475 wells.

E. ADOPTION OF A LEGAL RULE TO GOVERN CONFLICTS BETWEEN ADJOINING OWNERS—*Olson v. City of Wahoo*

It was during this second period that the Nebraska Supreme Court formulated a rule which would eventually determine how men viewed their rights to Nebraska's underground water resources. Plaintiff Olson, in *Olson v. City of Wahoo*,³⁹ had installed pumping machinery for use in his commercial sand and gravel pit. He had sufficient water until April, 1930, when Wahoo constructed a new well 3,400 feet from the pit and began operating a steam turbine engine capable of producing 900 gallons of water a minute. Olson claimed the extractions, plus the 300 gallons per minute pumped by the city's older nearby well, caused such a lowering of the water table under his land that by August pumping had become impossible.⁴⁰ After the town took the position that any receding of the water level was due to the extremely dry weather, Olson sued to restrict the town's withdrawals to 300 gallons per minute and for 30,271 dollars in damages.

The suit developed into a battle of experts. Professor A.C. Lugn, a University of Nebraska geology professor, testified that

37. Natural gas also has been an important source of power for farm irrigation. See Address by George E. Johnson, Chief Engineer, Central Nebraska Public Power & Irrig. Dist., in PROCEEDINGS at 22 (Dec. 1954).

38. Professor Earl Finbar Murphy has hypothesized that it was ultimately beneficial that judges in the nineteenth century adopted a *laissez faire* approach to groundwater.

The effect of allowing the newer interdictors to pump without restrictions or regard to the needs of others was to force upon those whose wells dried up the burden of developing new drilling techniques that would give them some assurance of protection. Probably the zeal with which well engineering was developed in the latter nineteenth century was due to the crisis in underground water rights created by the courts.

Murphy, *Regulating Groundwater in Humid Zones*, in CONTEMPORARY DEVELOPMENTS IN WATER LAW 56-57 (C. Johnson & S. Lewis eds. 1970).

39. 124 Neb. 802, 248 N.W. 304 (1933).

40. The decline between April and August was four feet. At the time of the trial a year later, the water table had lowered another two feet for a total of six feet in sixteen months. *Id.* at 805, 248 N.W. at 306. See also Brief for Appellants at 9.

As far as there is any evidence the cause of the lowering in the sand pit is local, and there is no other local cause adequate to account for the lowering other than the pumping, so I would conclude that the pumping is responsible for that lowering of the water in the sand pit.⁴¹

Conversely, engineers testifying for the defendant stated that pumping of the city's wells could have had no possible influence on the water level of the Olson gravel pit 3,400 feet away.

At the conclusion of the evidence, the trial judge decided Olson had failed to prove the city's pumping caused the lowering of the water level. Olson appealed to the Nebraska Supreme Court. In upholding the lower court, the supreme court reasoned that if it were true as Olson himself contended that the gravel pit was directly connected to the former bed and channel of the Platte River he could obtain an almost inexhaustible supply of water by simply deepening his pit through an existing clay bed. Because the case was decided on this basis, language regarding the parties' rights had there been a provable interference is dictum.

Both the court and the parties recognized that there were conflicting rules governing rights in groundwater, but neither the briefs nor the opinion indicate any comprehension of the importance of the choice on future development and management of groundwater.

The town's position was uncomplicated. The town argued that the common law of England⁴² had been in effect since territorial days, and under the English doctrine set forth in the leading cases, *Acton v. Blundell*⁴³ and *Chasemore v. Richards*,⁴⁴ Olson had no

41. 124 Neb. at 806, 248 N.W. at 306.

42. Brief for Appellee at 70-71. During the first session of the Nebraska Territorial Legislature in 1855, the common law of England was adopted except for inconsistencies with the Constitution of the United States, the organic law of the Territory, and the subsequent laws to be passed. Neb. Laws p. 31 (1855); Session Laws p. 144 (1855). The act adopting the common law of England was retained in the revised statutes through the transition to statehood. NEB. TERR. REV. STAT. c. VII, p. 31 (1867). Today the section appears in NEB. REV. STAT. § 49-101 (Reissue 1968). See *Metropolitan Utils. Dist. v. Merritt Beach Co.*, 179 Neb. 783, 140 N.W.2d 626 (1966); *State ex rel. Wright v. Barney*, 133 Neb. 676, 276 N.W. 676 (1937); *Williams v. Miles*, 68 Neb. 463, 471, 94 N.W. 705, 708 (1903). See generally Hall, *The Common Law: An Account of Its Reception in the United States*, 4 VAND. L. REV. 791 (1951).

43. 152 Eng. Rep. 1223 (Ex. 1843).

The person who owns the surface may dig therein, and apply all that is there found to his own purposes at his free will and pleasure; and . . . if in the exercise of such right, he intercepts or drains off the water collected from underground springs in his neighbor's well, this inconvenience to his

cause of action. Under the English rule a landowner has absolute ownership of the waters under his land.⁴⁵ Therefore, the city could without liability withdraw water for any purpose even if it drained all the water from beneath surrounding lands.⁴⁶ In actuality, the English doctrine represents anarchy because the allocation of water is determined by location and the pumping capacity of wells. Law has no role in the system.

Olson urged the court to adopt the American rule of reasonable use which he referred to both as the doctrine of reasonable use and as the doctrine of correlative rights.⁴⁷ The doctrines, however, are distinguishable. The doctrine of reasonable use allows the owner of land the use of only a reasonable amount of subterranean water on his overlying land. In contrast, the doctrine of correlative rights requires an apportioning of water between neighbors in times of shortage. The rules also had been referred to interchangeably in *Meeker v. City of East Orange*,⁴⁸ called "the leading case" in plaintiffs' brief, and thus the mistake was not uncommon.⁴⁹ The Nebraska court likewise failed to recognize that the two rules are distinct. After stating it favored the American rule, the court in dictum set out the rule of reasonable use in terms incorporating the California doctrine of correlative rights:

The American rule is that the owner of land is entitled to appropriate subterranean waters found under his land, but he cannot extract and appropriate them in excess of a reasonable and beneficial use upon the land which he owns, especially if such use is injurious to others who have substantial right to the waters, and if the natural underground supply is insufficient for all owners, each is entitled to a reasonable proportion of the whole. . . .⁵⁰

This rule of reasonable use, with its added feature from the Cali-

neighbor falls within the description of *damnum absque injuria*, which cannot become the ground of an action.

Id. at 1235.

44. 11 Eng. Rep. 140 (H.L. 1859). For a review of the English cases, see H. COULSON & V. FORBES, *THE LAW OF WATERS* 220-41 (6th ed. 1952).
45. Brief for Appellants at 54, *Olson v. City of Wahoo*, 124 Neb. 802, 248 N.W. 304 (1933).
46. See Harnsberger at 727. Malicious waste should be prohibited. See *Menne v. City of Fond du Lac*, 273 Wis. 341, 77 N.W.2d 703 (1956); *Huber v. Merkel*, 117 Wis. 355, 94 N.W. 354 (1903); *Chatfield v. Wilson*, 28 Vt. 49 (1855). See also Comment, *The Law of Underground Water; A Half-Century of Huber v. Merkel*, 1953 WIS. L. REV. 491, 493-95; H. ELLIS, J. BEUSCHER, C. HOWARD & J. DEBRAAL, *WATER-USE LAW AND ADMINISTRATION IN WISCONSIN* 86-90, 437-38, 456-58 (1970); 1 CLARK at 72.
47. Brief for Appellants at 54, 55, 59.
48. 77 N.J.L. 623, 74 A. 379 (Err. & App. 1909).
49. See Hanks at 631.
50. 124 Neb. at 811, 248 N.W. at 308.

fornia doctrine for apportionment in time of shortage, was approved by the Nebraska Supreme Court in several later decisions.

In 1936 *Olson* was cited in *Osterman v. Central Nebraska Public Power District*⁵¹ as authority for the proposition that riparian owners who receive benefits from subirrigation can challenge a trans-basin diversion of waters from the Platte River. In *Luchsinger v. Loup River Public Power District*,⁵² a 1941 case, a factual situation arose in which a plaintiff again invoked the reasonable use rule. In *Luchsinger*, water passing through the defendant district's powerhouse emptied into the Loup River by way of a tailrace, or artificial canal excavated by the defendant during the winter of 1935 and the spring of 1936. It was more than seventy yards wide, over twelve yards deep and extended for a distance of about three miles. Plaintiff owned a sixty-eight-acre tract of land adjacent to the tailrace and an eighty-acre tract one-half mile to the west. Before excavation, the water-table was generally two to five feet below the surface and produced subirrigation; afterwards, it fell thirteen to twenty feet below the surface due to water draining through the canal bank into the tailrace. The court held defendant liable for damages and emphatically adopted the dictum of *Olson*:

It is argued, however, that this is dictum in the [*Olson*] opinion in which it appears and not binding on defendant in the present controversy. Whatever may be thought of its applicability to the case in which the rule was adopted, it answers for itself as a sound proposition of law essential to the protection of property rights of private individuals and is consistent with the Constitution and with morality and justice. . . . The American rule is not only law in Nebraska, but it applies to property damaged for public use as well as to property taken for public use.⁵³

Since the *Luchsinger* decision, writers have assumed the court will apply the apportionment doctrine without qualification in future cases.⁵⁴ This assumption, which may be a mistaken one, and the intricacies of the reasonable use and correlative rights doctrines,

51. 131 Neb. 356, 365, 268 N.W. 334, 338 (1936):

We are committed to the rule: "The owner of land is entitled to appropriate subterranean waters found under his land, but his use thereof must be reasonable, and not injurious to others who have substantial rights in such waters." *Olson v. City of Wahoo*, 124 Neb. 302, 248 N.W. 304.

52. 140 Neb. 179, 299 N.W. 549 (1941).

53. *Id.* at 182, 299 N.W. at 551. The court reaffirmed its express repudiation of the English rule when it stated: "A rule of law in conflict with the common law of England has been adopted in Nebraska. . . ." *Id.*

54. See, e.g., Committee on Ground and Surface Water, 81 Neb. Legis. Council Rep. 34-35 (1956); C. Petrus Peterson, PROCEEDINGS 36 (1944); Danielson, *Groundwater in Nebraska*, 35 NEB. L. REV. 17, 22 (1955); Harnsberger at 730; 29 NEB. L. REV. 645, 648 (1950).

are considered later in the paper when common pool problems are discussed in more detail. What is significant at this point is that Nebraska began its era of greatest water development with no legal focus except the judicial rule of reasonable use, an articulated but never applied requirement of sharing in time of shortage,⁵⁵ and prohibitions against wasting⁵⁶ and polluting.⁵⁷

F. LEGISLATIVE RESPONSE AND PUBLIC OPINION DURING THE SECOND PERIOD

By the 1940's some authorities in the field of water resources were estimating that not more than 60,000 to 100,000 additional acres could be successfully irrigated from wells in Nebraska. Professor Lugn at the University of Nebraska, however, thought the figure should be 2,500,000 or more.⁵⁸ In the fall of 1940 the Legislative Council, aware of the diverse opinions, ordered an official study to determine "whether or not state regulation or control of the use of groundwater for purposes of irrigation is needed, and if so, what type of regulation should be established."⁵⁹ The result was a brief fifteen-page report confined mainly to presenting information on pump irrigation in the state. No recommendations were made for legislative action but references were included regarding provisions to be incorporated in a statute if one were adopted, and the tenor of the study supported managing groundwater withdrawals.

In the judgment of some authorities, the lack of state control or regulation not only prevents the adoption of needed conservation measures . . . but may also discourage some potential pump irrigators who would otherwise drill wells upon their own land. In the absence of regulation or established rules of priority, prospective irrigators have no assurance that they would be permitted a continued and uninterrupted use of the water from their wells. Not only may other owners tap the same water supply to the extent that it would be impaired, but there is no legal certainty that if and when a system of regulation is established the wells then in opera-

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55. In *Olson v. City of Wahoo*, 124 Neb. 802, 248 N.W. 304, 307 (1933), the court referred to the "underground stream" doctrine, but the doctrine which provides for apportioning subterranean water in accordance with the law of surface watercourses has little or no application in Nebraska. For a general discussion, see Harnsberger at 731; 1 CLARK at 323-26.
56. Neb. Laws c. 84, § 1 (1897), COMP. STAT. § 46-172 (1929); now NEB. REV. STAT. § 46-281 (Reissue 1968).
57. *Lowe v. Prospect Hill Cemetery Ass'n*, 58 Neb. 94, 78 N.W. 488 (1899) (ass'n enjoined from interring bodies where evidence showed probable result to be contamination of neighboring wells); *Beatrice Gas Co. v. Thomas*, 41 Neb. 662, 59 N.W. 925 (1894) (well pollution).
58. See 14 Neb. Legis. Council Rep. 6 (1940).
59. *Id.* in *Preface*.

tion will be recognized as having prior rights. An owner may now register his well and such registration *may* be given priority in any subsequent regulation, but he has no definite assurance that this will be true.⁶⁰

No action was taken as a result of the report, but prominent advocates of managing groundwater were beginning to speak out. The following statements made at annual meetings of the Nebraska State Irrigation Association between 1939 and 1949 are illustrative of the growing concern:

1940, Harry Gantz, State Senator from Alliance: There are two alternatives. [T]he law of the jungle as applied to the use of groundwaters; or second, legislation may be enacted defining groundwater rights and providing for adjudication of all rights and for state control and administration.⁶¹

1940, A. C. Tilley, State Engineer: [T]here is need for legislation to provide for the regulation and use of underground waters of the state.⁶²

1944, C. Petrus Peterson, State Senator from Lincoln, Chairman of the Legislative Committee on Water Problems and later President of the National Reclamation Association: As to groundwater and rights therein, very little has so far been accomplished either by definition of rights or establishment of public policy. By judicial decision (*George W. Olson v. City of Wahoo*), we are thus far committed to what is known as the American doctrine. . . . The mere statement of this American doctrine is sufficient to indicate the impossibility of a practical application in the event pump irrigation becomes over-developed and the available supply impaired. All scientific studies indicate that a concentrated development of pump irrigation will outrun the annual increment of recharge of the groundwater supply. What is even more difficult in seeking a solution for the problem is the fact that the diminishing supply is only gradually observed and when the supply is exhausted, long periods are required for restoration of the supply.⁶³

1949, F.H. Klietsch, State Engineer: I wish to bring up the problem of groundwater control. Due to the rapid development of irrigation to date and large irrigation developments that are in the making, it seems to be a logical time for giving consideration to new legislation that would provide for control of the groundwater supply. . . . [S]ome control of groundwater appears necessary in order to stabilize the water table to insure a dependable groundwater supply for domestic and municipal uses and such control would, no doubt, provide more for irrigation purposes. Integration

60. *Id.* at 11.

[O]ne thing essential to the realization of maximum benefits from this type of irrigation, according to most students of the problem, is a more effective system of state regulation or control.

Id. at 6.

61. PROCEEDINGS at 62 (1940).

62. PROCEEDINGS at 41 (1940).

63. PROCEEDINGS at 36 (1944).

of groundwater and surface water is necessary and can only be accomplished if both are controlled. . . . The most effective administration of new legislation on this problem can best be assured if the rights to use groundwater have not become too extensively vested.⁶⁴

The monitions were ignored and the second era ended without guidelines for future growth other than the vague and unworkable rule of the *Olson* case.

V. THE THIRD ERA—1950 TO 1972

A. RAPIDITY OF GROWTH

A serious drought early in the third period began in 1952 and extended into 1956. Between January 1955 and August 1956 there was an average precipitation deficiency of 9.81 inches and as much as eighteen inches in some local areas.⁶⁵ The spring of 1955 was the driest since 1943 with precipitation twenty-five percent below normal; in the spring of 1956, rainfall was fifty percent below normal. This caused a surge in well development with a more than 100 percent expansion in pump irrigated acreage between 1950 and 1955. Total irrigation wells also increased from around 12,000 in 1954 to approximately 18,000 in 1956.

The following statistics show the rapidity of growth:

Year	Number of Irrigation Wells in Nebraska	Acres Irrigated
1950	7,475	448,500
1955	14,882	909,110
1957	22,093	1,704,350
1959	25,069	1,910,000
1964	25,903	2,007,805
1969	33,523	2,600,000 ⁶⁶

64. PROCEEDINGS at 19 (1949). A similar view was expressed by the Nebraska State Planning Board in 1941.

We have associated the underground water supply with the land for so long that now we regard the ownership of any land as including the underlying water supply as well. If no extensive uses were to be made of this supply, there would be no need of administrative measures. However, the demands made upon the underground water supply have shown a decided increase during recent years. Unregulated uses of this vital natural resource will eventually result in conflicting claims. The successful operation of new or amended laws will be better assured if the rights to use groundwater have not become too extensively vested.

NEBRASKA STATE PLANNING BOARD, WATER RESOURCES OF NEBRASKA xv (1941).

65. See 81 Neb. Legis. Council Rep. 3 (1956).

66. FRAMEWORK STUDY at 72, 115. For a map of Nebraska showing the

In 1970, 1,500 more wells were installed and by January 1, 1971, the total registered with the Department of Water Resources reached 35,292.⁶⁷ The number of irrigation wells registered in each county during 1971, and the total number of wells registered as of the end of 1971 are shown in **Figure 1**.

B. AN OVERVIEW OF DEVELOPMENTS IN SPECIFIC AREAS

The vast growth took place because irrigation is advantageous in both normal and drought periods. In addition, farmers eliminated the expensive land grading necessary for gravity systems when they began using sprinkler systems on a large-scale during the drought in 1955 and 1956. As a result, by 1957 twenty-two percent of the acreage in Nebraska irrigated with groundwater was irrigated by sprinklers.⁶⁸ Sprinklers can be used on either rough topography or on land that has little or no slope, and there are types of systems to fit individual requirements. Among these are the handmove, tow line, giant boom, side or wheel roll, side-move (with or without trailer line), straight lateral self-propelled, traveler or big gun, and solid set.⁶⁹ The "center pivot," developed in 1949 by Frank Zybach of Columbus, Nebraska, has been widely utilized in the state since the early 1960's. This sprinkler operates like an enormous one-handed clock. The pipe arm, usually about seven inches in diameter and up to 1,300 feet in length, is driven either by an electric motor or water or oil pressure and travels around a field of about 130 acres. There are about 350 of these systems in the North Platte area and more than 600 in Holt County alone.⁷⁰

general location of lands irrigated with groundwater, see *id.* at 75. Twenty percent of the 19.2 million acres classified as suitable for irrigation in Nebraska is irrigated; of this 3.7 million acres under irrigation, about 2.6 million, or 70%, are irrigated with groundwater. See *id.* at 69, 72, 77.

67. "[T]here are strong indications that as many as 20 percent of the irrigation wells in the state may not be registered . . ." Opening Statement by U. of Neb. President D.B. Varner, in PROCEEDINGS OF THE NEBRASKA WATER RESOURCES AND IRRIGATION DEVELOPMENT SEMINAR FOR THE 70'S, C-1, C-7 (U. of Neb., Lincoln, March 2-3, 1972).
68. T. Thorfinnson, N. Swanson & A. Epp, Cost of Distributing Irrigation Water by the Sprinkler Method 5 (Neb. Ag. Exp. Stat. Bull. 455, March 1960).
69. TEXAS HIGH PLAINS UNDERGROUND WATER CONSERVATION DIST. No. 1, THE CROSS SECTION 1-2 (June 1971); J. DECKER, H. MULLINER & J. DAVIS, MECHANICALLY MOVED SPRINKLER SYSTEMS (U. of Neb. College of Ag. Ext. Cir. EC 65-753, Jan. 1966).
70. Lincoln Journal, Oct. 4, 1970, § C, at 4, col. 5; NEBRASKA SOIL AND WATER CONSERVATION COMM'N, NEBRASKA RESOURCES 1 (Issue No. 4, Summer 1971). For similar developments in Chase County, see Omaha World-Herald, Oct. 17, 1971, Magazine of the Midlands, at 14.

Returns have been high. In 1953 Gosper, Phelps, Kearney and Adams counties had an average of eleven bushels of corn per acre on dry land and fifty-five bushels on irrigated land, and "averages in the entire South Platte territory were not much different than in the above four counties."⁷¹ Today irrigated corn yields in the area average more than 125 bushels per acre.

Irrigated corn yields for Nebraska in 1967 surpassed nonirrigated production, 187 million bushels to 146.6 million, and the gap has continued to widen. Nearly fifty percent of the corn grown in the state is under irrigation, and the percentage will increase. The level of economic activity in many areas is closely related to the development of irrigation. A 1968 state-wide input-output study by the University of Nebraska showed that irrigation of land, both federally and privately sponsored, increased business activities by 812 million dollars. In other words, each one dollar of crop production made possible by irrigation created an additional 6.68 dollars in business volume in other segments of the economy.⁷²

While there is no reason to believe that supplemental irrigation will not continue to be profitable, it may increase economic risk. When precipitation is deficient a dry land farmer may lose thirty-five bushels of corn per acre, but in times of shortages in both rainfall and groundwater a farmer using irrigation might lose 150 bushels per acre in addition to his expenditures for fertilizers and other inputs associated with achieving large yields. Further, pump irrigation may lead farmers to overemphasize increasing gross revenue while underemphasizing changes in net income.⁷³

71. PROCEEDINGS at 21 (1954).

72. T. ROESLER, F. LAMPHEAR & M. BEVERIDGE, *THE ECONOMIC IMPACT OF IRRIGATED AGRICULTURE ON THE ECONOMY OF NEBRASKA* 1-2 (Neb. Econ. and Business Reports No. 4, Sept. 1968). The study measures the impact of irrigated agriculture on the state's economy during the period since World War II.

73. L. Fischer, *Management of Groundwater* 4 (paper presented at annual meeting of American Water Resource Ass'n in Omaha, Oct. 20, 1971).

High gross revenue seems to be unduly attractive (a) to prospective irrigators because they are not fully aware of what happens to costs, capital requirements, risks and demands on management with the initiation of irrigation; (b) to those who sell farm inputs, including credit capital, and handle and process farm products because of the opportunity to profit regardless of how the irrigator fares; (c) to individuals in a community who are real estate owners or in business not directly related to irrigation because of the opportunity for economic gain from the expenditures of residents who are retained or attracted by the induced economic activity

Id.

The Dean of the College of Agriculture at the University of Nebraska estimated in 1964 that irrigation wells would increase at the rate of 500 annually for ten years and that the number would be 1,000 if drought threatened.⁷⁴ This estimate proved to be conservative. By 1970 there had already been an increase of 9,389 wells, a seven year figure close to the Dean's ten year drought estimate.

C. DECLINING WATER TABLES

In some areas the growth in irrigation has caused groundwater pumpage to exceed recharge even in years of favorable precipitation.⁷⁵ Wells measured in 1946 and remeasured in the fall of 1964 in the Alliance area of Box Butte County showed the water table had dropped an average of twenty-one feet, a range of 1.9 to 45.5 feet.⁷⁶ Since little recharge takes place in this area almost all of the pumpage comes from storage. Conditions in Holt County, where declines between ten and fifteen feet have occurred in recent years, are similar to those in Box Butte County.⁷⁷ Two other areas are even more critical. In its *Report on the Framework Study*, the Nebraska Natural Resources Commission reported that the largest of the four areas in Nebraska where a decline in the groundwater table has become significant

is located in the Big and Little Blue River Basins and extends through parts of Adams, Clay, Fillmore, Thayer, Saline, Hamilton, York, Seward, Polk, and Butler Counties. The amount of recharge through precipitation in this area is less than the amount withdrawn, and because of the geologic and hydrologic conditions, part of the irrigation water pumped is being taken from stored groundwater.⁷⁸

74. Lincoln Journal, Feb. 22, 1964, at 6, col. 1.

75. See, e.g., *Hearings on H.R. 2681 and H.R. 1905 Before the Subcomm. on Irrigation and Reclamation of the House Comm. on the Interior and Insular Affairs*, 88th Cong., 2d Sess., at 104, 122, 148 (1964); KEECH, *THE PROGRAM OF GROUNDWATER INVESTIGATION IN NEBRASKA* 17-18, 21, 34-36 (Neb. Water Survey Paper No. 11, Jan. 1962); Reed, *Groundwater Report for 1965*, in *PROCEEDINGS* at 23 (1964) Wesley, *Underground Water Conservancy Districts*, in *PROCEEDINGS* at 91 (1964). A subcommittee of the Nebraska Legislative Council had concluded in 1944 that "the availability and usable supply of subsurface water for irrigation is very much less than is generally believed, and is in danger of being seriously depleted." 2 Neb. Legis. Council Rep. 55 (1944). See also Lincoln Journal, June 10, 1971, at 6, col. 5.

76. Speech by E.O. Reed, State Geologist, in *PROCEEDINGS* 23 (1965).

77. *FRAMEWORK STUDY* at 37.

78. In 1950, there were about 400 irrigation wells in Hamilton and York counties; by 1970, the number was 3,380 and there had been a net decrease of nearly 1 million acre-feet of stored water. Clay County had 100 irrigation wells in 1950; by 1970, the number was 1,241 and

Another area where the decline has been consistent occurs along the northern edge of the Platte Valley in Dawson, Buffalo and Hall Counties.

Here many irrigation wells are concentrated on the valley terraces, and large quantities of water have been pumped. The decline of water levels has been limited in most areas, however, because the depth to static water levels is generally less than 30 feet and in some areas is less than 15 feet. Therefore, a large part of the water withdrawn has been salvaged from what would ordinarily escape from the groundwater reservoir by natural means.

The greatest declines have occurred on terraces to the north of the river where the depth to water is greater and the water bearing materials are thin.⁷⁹

The latest irrigation boom has taken place in Perkins and Chase Counties in the southwest corner of the state. The changing water levels in this area can be illustrated by examining the records of an observation well two miles northwest of Imperial. It has been monitored for seven years by the University Conservation and Survey Division. During that time the number of wells within a five mile radius has increased from twenty-five to seventy-six. When the irrigation season began in 1964, the water level was fifty-six feet below the surface; at the end of the season it had dropped to 58.5 feet. When the season began in 1970 the level was already down to sixty-two feet below the surface and by the end of the season it had dropped an additional 3.5 feet to a level of 65.5 feet below the surface. Each foot of decline represents many acre-feet of water per square mile of land and therefore the losses are significant. When discussing declining water levels in Perkins County in November of 1970, Vincent Dreeszen, Director of the Conservation and Survey Division, said: "As this trend continues, it will be only a matter of time before groundwater depletion reaches serious proportions in progressively larger areas."⁸⁰

These and similar situations have led experts to predict an ultimate water shortage in Nebraska unless a program of balanced irrigation is started.⁸¹ As irrigators continue competitive pumping from the common reservoirs overlying their lands, water tables will continue to decline and in times of drought severe problems may be anticipated.

stored water had been depleted 650,000 acre-feet. NEBRASKA NATURAL RESOURCES COMM'N, NEBRASKA RESOURCES 8 (Nov. 8, 1972).

79. FRAMEWORK STUDY at 37.

80. Omaha World-Herald, Nov. 14, 1971, § B, at 27, cols. 1-2.

81. E.g., Cramer, *Municipal and Industrial Water Use in Nebraska*, in PROCEEDINGS OF THE NEBRASKA WATER CONFERENCE 40 (1957); E. Reed, *The Problem of Municipal Water Supply in Eastern Nebraska*, 1961 (unpublished paper by the State Geologist).

D. JUDICIAL RULES GOVERNING DISPUTES BETWEEN ADJACENT LANDOWNERS⁸²

By 1957, common pool problems⁸³ were serious enough to warrant enactment of a series of statutes, including a well spacing law,⁸⁴ discussed later in this article. The laws did little toward solving conflicts between irrigators. As water levels lowered, a prevalent problem was the longer lifts which increased pumping costs to the point where operations became unprofitable for some irrigators.⁸⁵ Another problem was pulling water from shallow domestic wells. As these situations continued to arise, interested parties began to search out the available legal remedies where a landowner is damaged by the diversion of groundwater. The proper course, however, was obscure since the available remedies⁸⁶ and applicable legal rules had never been delineated by the Nebraska Supreme Court.

As previously mentioned, in *Olson v. City of Wahoo*,⁸⁷ the Nebraska Supreme Court indicated approval in dictum of the American rule of reasonable use supplemented by the California doctrine of correlative rights. The court said that "if the natural un-

82. Numerous articles discuss groundwater rules. Citations may be found in 1 CLARK at 7 n.20. For a comprehensive recent analysis, see Hanks. For a discussion of Nebraska problems, see Harnsberger.

83. For general descriptions of the physical and economic factors involved, see J. HIRSHLEIFER, J. DEHAVEN & J. MILLIMAN, WATER SUPPLY: ECONOMICS, TECHNOLOGY, AND POLICY 59-66 (1960); Friedman, *The Economics of the Common Pool: Property Rights in Exhaustible Resources*, 18 U.C.L.A.L. REV. 855 (1971); Widman at 523.

84. Neb. Laws c. 201, §§ 2, 3, 4 (1957), now NEB. REV. STAT. §§ 46-609 to -611 (Reissue 1968). See Harnsberger at 733.

85. See Costello, *Cropland and Corral*, Lincoln Journal, Nov. 27, 1971, at 13, col. 1. ("Fuel costs for operating an irrigation pump are rising at an incredible rate, while the price of grain has not improved. . . . The problem with dropping water tables needs to be considered.") See also Gantz, *Legislation Necessary to Govern Diversion of Groundwater*, in PROCEEDINGS at 48 (1940) (statement by State Sen. Harry E. Gantz).

86. For discussions of remedies, see H. ELLIS, J. BEUSCHER, C. HOWARD & J. DEBRAAL, WATER-USE LAW AND ADMINISTRATION IN WISCONSIN §§ 8.01-8.10 (1970); F. MALONEY, S. PLAGER & F. BALDWIN, WATER LAW AND ADMINISTRATION: THE FLORIDA EXPERIENCE 159 (1968); H. ROGERS & A. NICHOLS, WATER FOR CALIFORNIA §§ 380-447 (1967); F. MANN, H. ELLIS & N. KRAUSZ, WATER-USE LAW IN ILLINOIS 191-227 (U. Ill. Ag. Exp. Stat. Bull. 703, 1964). In *Wischmann v. Raikes*, 168 Neb. 728, 97 N.W.2d 551 (1959), noted 39 NEB. L. REV. 441 (1960), the court held that when a number of plaintiffs sue for an injunction which is granted, an original plaintiff cannot bring a later action for damages. The safe procedure when asking for an injunction in Nebraska is to sue for the damages sustained as a result of the thing or event enjoined.

87. 124 Neb. 802, 248 N.W. 304 (1933).

derground supply is insufficient for all owners, each is entitled to a reasonable proportion of the whole. . . ."⁸⁸ On the other hand, in *Metropolitan Utilities District v. Merritt Beach Co.*, the court stated that the American doctrine of reasonable use is the law in the state and no mention was made of sharing the supply in time of shortage.⁸⁹ The effect of dropping the apportionment language is problematical, but it may indicate that the court has become alerted to the important differences between the doctrines.

1. *The Reasonable Use Doctrine*

The American rule of reasonable use, like the English doctrine of absolute ownership, recognizes that an overlying owner has a proprietary interest in the water under his land, but his incidents of ownership may be restricted when diversions are made for transportation to places away from the overlying lands and harm results to adjacent users. Under the reasonable use doctrine two neighboring landowners, each of whom is using the water on his own property overlying the common supply, can withdraw all of the supply he can put to a beneficial and reasonable use. What is reasonable is judged solely in relationship to the purpose of such use on overlying land; it is not judged in relationship to the needs of others. This is different than the riparian rule of reasonable use which requires sharing surface watercourses on a proportionate basis.⁹⁰

When groundwater is utilized on overlying land, the purpose generally is domestic use, air conditioning, irrigation, manufacturing, mining and quarrying. Since these uses have high economic or social value and are usually the most efficient ones possible, courts almost always find them reasonable.⁹¹ Wasteful use or evidence of malice, however, justifies a finding of unreasonableness.⁹² In cases of pollution, many jurisdictions find that reasonableness depends on the special circumstances in each case.⁹³ Pollution, however, should be handled on the basis of nuisance, *i.e.*, on the basis of the injuries which a plaintiff suffers and not on the defendant's activities.⁹⁴

When analyzed, it is evident that the right of an overlying land-

88. *Id.* at 811, 248 N.W. at 308 (1933).

89. 179 Neb. 783, 800-01, 140 N.W.2d 626, 637 (1966).

90. Clark, *Groundwater Management: Law and Local Response*, 6 ARIZ. L. REV. 178, 184 n.36 (1965).

91. *E.g.*, *Bristor v. Cheatham*, 75 Ariz. 227, 255 P.2d 173 (1953); *Finley v. Teeter Stone, Inc.*, 251 Md. 428, 248 A.2d 106 (1968).

92. 5 R. POWELL, REAL PROPERTY ¶ 726 (1970).

93. *Id.*

94. RESTATEMENT (SECOND) OF TORTS § 849 (Tent. Draft No. 17, 1971).

owner to take and use groundwater is almost as absolute under the reasonable use rule as under the English common law doctrine of absolute ownership. The important point is that the reasonable use rule does not prohibit exhausting the entire supply even though other overlying owners are injured or completely deprived of water,⁹⁵ and in applying the principle between adjacent land owners over a common pool a court has only to determine the extent of overlying land and whether the use being made of the water on it is reasonable.

2. *The Correlative Rights Doctrine*

The correlative rights doctrine, or California rule, was first stated in *Katz v. Walkinshaw*,⁹⁶ and has been discussed at length in numerous subsequent California decisions. Under the doctrine, overlying owners have no proprietary interest in the water under their soils.⁹⁷ Each owner over a common pool has an equal and correlative right to make a beneficial use of the water on his overlying lands. Priority of use is unimportant⁹⁸ since in time of shortage the common supply is apportioned among the overlying owners on the basis of their reasonable needs.⁹⁹ This is tantamount to the

95. The rule is stated correctly in *Canada v. City of Shawnee*, 179 Okla. 53, 64 P.2d 694 (1937). The *Canada* case is discussed by Professor Joseph Rarick in *Oklahoma Water Law, Ground or Percolating in the Pre-1971 Period*, 24 OKLA. L. REV. 403, 408-16 (1971). See also *Sloss-Sheffield Steel & Iron Co. v. Wilkes*, 231 Ala. 511, 517, 165 So. 764, 769 (1936) (He [the overlying landowner] may pump or draw or drain such waters without liability to his neighboring landowners, when it is proper for the natural and legitimate use or improvement of his own land, but not in an unreasonable manner . . .); *Bristor v. Cheatham*, 75 Ariz. 227, 255 P.2d 173 (1953); *Clinchfield Coal Corp. v. Compton*, 148 Va. 437, 139 S.E. 308 (1927). "The reasonable use rule . . . permits a landowner to make reasonable beneficial use of percolating groundwaters to the extent necessary to improve his land even if he reduces a neighbor's use or drains his lands." 1 CLARK at 330. For an outstanding analysis of the cases, see Hanks. Professor Frank Trelease, one of the leading authorities on water law, has written, "As between persons using the water on the overlying land, there is no apportionment . . ." RESTATEMENT (SECOND) OF TORTS § 849, comment at 154 (Tent. Draft No. 17, 1971). After analyzing the decisions, another eminent authority has written: "Reasonable use of groundwaters does not require the overlying owners to share the supply in place. The requirement is simply that the supply be put to a reasonable use or beneficial purpose *in relation to the land.*" Clark, *Groundwater Management: Law and Local Response*, 6 ARIZ. L. REV. 178, 184 n.36 (1965).

96. 141 Cal. 116, 137, 70 P. 663 (1902), 141 Cal. 116, 74 P. 766 (1903).

97. HUTCHINS at 450; *Kirkwood, Appropriation of Percolating Water*, 1 STAN. L. REV. 1, 6-7 (1948).

98. HUTCHINS at 437, 440.

99. HUTCHINS at 438. Each may take only his reasonable share. O'Leary

riparian law applicable to streams which places quantitative restrictions on use when there is an insufficient supply.

A principal and difficult question which arises in connection with the correlative rights rule is how to allocate the water supply.¹⁰⁰ Professor Joseph Sax has written that, "The California courts, which have developed the doctrine, do not seem to have settled on any specific formula by which the water is to be divided."¹⁰¹ In *Katz v. Walkinshaw* the Supreme Court of California observed in dictum that, "Disputes between overlying landowners, concerning water for use on the land, to which they have an equal right, in cases where the supply is insufficient for all, are to be settled by giving to each a fair and just proportion. . . ."¹⁰² Although total land area or area under irrigation is undoubtedly a relevant consideration, the actual division when there is not enough water will be based on the judge's view of the reasonable necessities of each party and the overall equities. It has been pointed out that even if an area allotment made sense in assigning "just and fair" proportions in agricultural disputes, there is no necessary connection in industry between the quantity of water which may be beneficially used and overlying land area. "Here it makes more sense to apportion the shortage on the basis of previous beneficial use. . . ."¹⁰³

Some commentators have taken the position that the reasonable use rule has been abandoned by a number of eastern courts which have specifically adopted a reasonable use rule as to percolating waters that is similar to the reasonable use rule governing riparian rights in surface streams. Under these decisions, reasonableness is a question of fact to be determined by both the use of the water and the similar rights of other landowners. This application of the

v. Herbert, 5 Cal. 2d 416, 422-23, 55 P.2d 834, 837-38 (1936); Eckel v. Springfield Tunnel & Dev. Co., 87 Cal. App. 617, 262 P. 425 (1927).

100. As Professor Charles Corker stated,

[I]mportant groundwater adjudications in California since 1949 have been based on a concept of mutual prescription, and not correlative rights. Under California-types mutual prescription, the total draft on a groundwater basin is reduced to its "safe annual yield"—the quantity of water which the basin would yield in perpetuity—and to that end each user is proportionately cut back in his rate of maximum continuous annual withdrawals of water during the preceding five-year period based on the statute of limitations.

CORKER at vii.

101. J. SAX, WATER LAW, PLANNING & POLICY 462 (1968). See also HUTCHINS at 436-48; Krieger & Banks, Groundwater Basin Management, 50 CALIF. L. REV. 56 (1962).

102. 141 Cal. 116, 135-36, 74 P. 766, 772 (1903).

103. Hanks at 638 n.73. See also *id.* at 644, 646. A well owner would be protected against a municipality transporting water from the reservoir area but not against an industry causing the same harm by using water on a plant site. See RESTATEMENT (SECOND) OF TORTS 157 (Tent. Draft No. 17, 1971).

reasonable use rule to percolating waters has been called the "correlative rights" doctrine by some courts but it should be distinguished from the California correlative rights doctrine which limits consumption on a proportionate share basis, rather than a reasonable use basis.¹⁰⁴

This approach, two reasonable use rules, is both confusing and unnecessary. The better and less ambiguous view is that the term "correlative rights" should be applied only to a groundwater rule which is similar to the reasonable use doctrine applicable to surface watercourses.¹⁰⁵

3. Conclusion

Although the reasonable use rule is easy to apply, it affords small users no protection and for that reason we believe it is unsatisfactory. We also find the correlative rights doctrine objectionable because, as a perusal of the California decisions shows, it involves tremendous administrative difficulties.¹⁰⁶ In actuality, Court Reference Proceedings are administered by water masters,¹⁰⁷ and the adjudications are enormously expensive.¹⁰⁸

In addition to court proceedings involving adjudicated rights, an effective public administrative management program has been developed at the local level in California, namely, Water Replenishment and County Water Districts.¹⁰⁹ If comprehensive manage-

104. Maloney & Plager, *Florida's Groundwater: Legal Problems in Managing a Precious Resource*, 21 U. MIAMI L. REV. 751, 770 (1967). See also F. MALONEY, S. PLAGER & F. BALDWIN, *WATER LAW AND ADMINISTRATION: THE FLORIDA EXPERIENCE* 157 (1968). The cases cited are *Jones v. Oz-Ark-Val Poultry Co.*, 228 Ark. 76, 306 S.W.2d 111 (1957); *MacArtor v. Graylyn Crest*, 111 Swim Club, Inc., 187 A.2d 417 (Del. Ch. 1963); *Erickson v. Crookston Waterworks Power & Light Co.*, 105 Minn. 182, 117 N.W. 435 (1908); *Nashville, C. & St. L. Ry. v. Rickert*, 19 Tenn. App. 446, 89 S.W.2d 889 (1935). For a criticism of this statement, see Hanks at 644.

105. See Hanks at 644 n.96.

106. *E.g.*, *City of Pasadena v. City of Alhambra*, 33 Cal. 2d 908, 207 P.2d 17 (1949). For a discussion of this litigation which lasted thirteen years, see THE RESOURCES AGENCY, CAL. DEPT OF WATER RESOURCES, *MEETING WATER DEMANDS IN THE RAYMOND BASIN AREA* (Bull. No. 104-6, June 1971). Numerous articles deal with the complexity of California groundwater law. *E.g.*, Gindler & Holburt, *Water Salinity Problems: Approaches to Legal and Engineering Solutions*, 9 NAT. RES. J. 329, 339 n.22 (1969); Moore & Snyder, *Some Legal and Economic Implications of Sea Water Intrusion—A Case Study of Groundwater Management*, 9 NAT. RES. J. 401, 406 (1969).

107. CORKER at 212.

108. *Id.* at 216 and app. 2 at A2-1.

109. See MEYERS & TARLOCK at 615. An outstanding example is Orange County. See *id.* at 618; Owen, *Groundwater Management and Reclaimed Water*, 60 J. AM. WATER WORKS ASS'N 135 (1968); L. Owen,

ment is undertaken in Nebraska, the organizational structure of the newly created Natural Resources Districts rather than court appointed masters should constitute the institutional framework. It would be much more efficient and far less expensive.

If, however, the legislature decides that a system of comprehensive public administrative management is unacceptable, we recommend that it codify a modified version of the reasonable use rule along the lines suggested by Professor Frank Trelease in the 1971 tentative draft of the *Restatement of the Law of Torts*.¹¹⁰ The proposed rule is that a landowner who withdraws water from his land and uses it for a beneficial purpose is not liable for interfering with utilization of the water by others unless the withdrawal causes unreasonable harm by lowering the water table or reducing artesian pressure.¹¹¹ At the present time small well owners in Nebraska are protected against the large scale diversions to distant lands by

The Challenge of Water Management, Orange County Water Dist. (paper prepared for LTD. Professional Symposium on Salt Water Encroachment of Aquifers, Baton Rouge, La., May 4-5, 1967). Owen has been District Engineer, Secretary Manager and Executive Secretary of the Orange County Water Dist.

110. RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1971). A state's power to prohibit or regulate the export of groundwater from the state without violating the Commerce Clause of the United States Constitution might depend on which rule is adopted. See White, REASONABLE STATE REGULATION OF THE INTERSTATE TRANSFER OF PERCOLATING WATER, 2 NAT. RES. LAWYER 383 (1969). In *City of Altus v. Carr*, 255 F. Supp. 828 (W.D. Tex. 1966), *aff'd mem.*, 385 U.S. 35 (1966), an Oklahoma city leased land owned by Texans for a municipal well field. After it had spent \$111 thousand and issued \$2 million of bonds, Texas passed a statute prohibiting the export of groundwater without legislative permission. In a suit before a three-judge federal court brought by the city and the landowners, the statute was held unconstitutional as an unreasonable burden on interstate commerce. The court found the nature of the landowners' property rights in the water to be an important consideration. "[T]he statute seeks to prohibit shipments of water while indulging in the substantial discrimination of permitting the unrestricted intrastate production and transportation of water between points within the State. . . ." *Id.* at 840. Cf. *Hudson County Water Co. v. McCarter*, 209 U.S. 349 (1908). Professor Sax has written:

While there is no established law on this subject, there is considerable authority to the effect that a state law prohibiting exportation of its resources beyond the state line is an unconstitutional impediment to interstate commerce. . . . See the discredited contrary view in *Hudson County Water Co. v. McCarter*.

J. SAX, *WATER LAW, PLANNING & POLICY* 90 (1968). The Nebraska statutes forbid transportation of groundwater to another state without a permit from the Dep't of Water Resources. NEB. REV. STAT. § 46-613.01 (Cum. Supp. 1972).

111. RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1971).

municipalities¹¹² and others, but they have no safeguards from large irrigation facilities or industries utilizing the water on overlying land. The proposed rule extends protection, whenever equitable, against large scale uses on overlying lands. The owner of a shallow domestic well who contributes only infinitesimally to the lowering of the water table in a heavily irrigated area would not be, as he is now, without a remedy.

If an irrigation use were judged unreasonable, the right of withdrawal would be subject to conditions requiring a practical adjustment such as providing an alternative supply or deepening the injured party's domestic well at the expense of the new user.¹¹³ Such relief probably is the maximum courts in Nebraska should be expected to offer.

If the problem confronts the supreme court before the legislature adopts a rule, the court should take the position that its references in prior decisions regarding the allocation of groundwater during periods of shortage were unnecessary to the holdings of the specific cases and made without full consideration of the point, *i.e.*, they constituted obiter dicta. The court would then be free to adopt a rule similar to the one suggested above, which we recommend.

E. SAFEGUARDING MUNICIPAL SUPPLIES

1. *Background*

Many Nebraska municipalities are facing increasingly complex problems in providing potable water supplies to their inhabitants. Eminent experts have predicted that if the present rate of increase in groundwater withdrawals for agricultural and urban use continues a number of cities will encounter shortages during periods of peak demand in the foreseeable future.¹¹⁴ Municipal water supplies presently pump about 184,000 acre feet annually, and it has been estimated that these withdrawals will triple in the next fifty years.¹¹⁵ In the Missouri Tributaries Basin, which includes the metropolitan area of Omaha, present usage is expected to quadruple. Almost all of this will be groundwater, and plans must be made which compensate for the peak demands which will occur during drought periods.

112. NEB. REV. STAT. § 46-647 (Reissue 1968). This section assures a landowner an action for damages after his right of injunction has been removed. It might serve as much as a remedy for owners of small shallow domestic wells as a practical adjustment, *e.g.*, furnishing an alternative supply.

113. See *TRELEASE-WIS.* at 167.

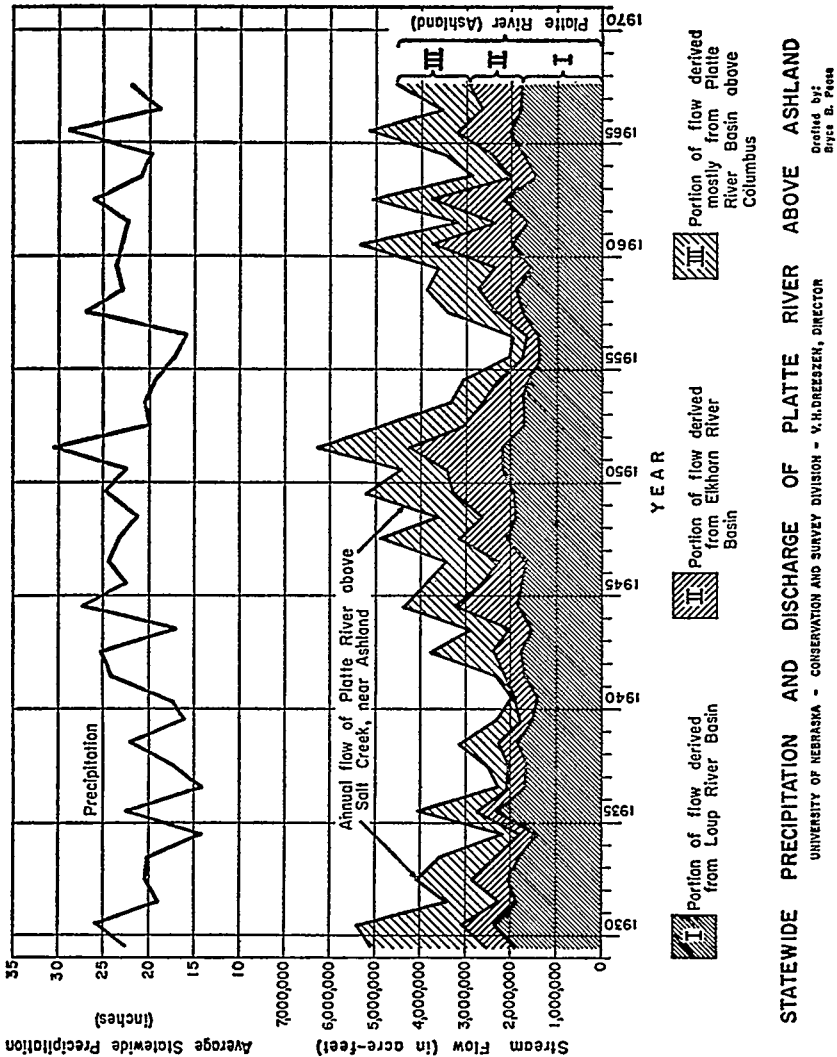
114. See E. Reed, *The Problem of Municipal Water Supply in Eastern Nebraska*, 1962 (unpublished paper by the State Geologist).

115. *FRAMEWORK STUDY* at 56-57.

To meet this increased demand, Omaha and Lincoln, together with a number of smaller communities located in the eastern part of the state along the lower Platte River Valley, will need much larger amounts of water. The effect of the shortage will be widespread since these communities have situated their well fields to take advantage of recharge from the Platte River itself,¹¹⁶ and they

116. For example, Figure 2 shows the portion of Platte River flow near

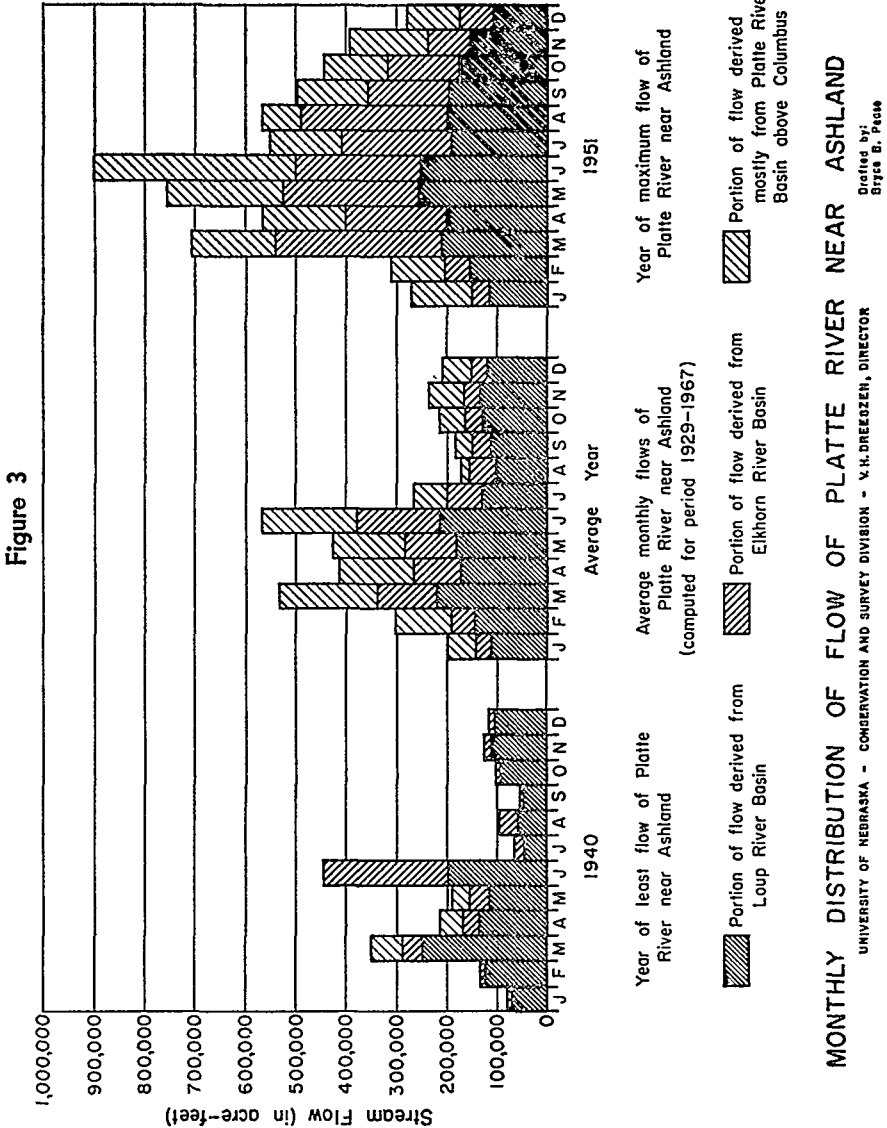
Figure 2



STATEWIDE PRECIPITATION AND DISCHARGE OF PLATTE RIVER ABOVE ASHLAND
 DRAFTED BY
 BRUCE B. PETER
 UNIVERSITY OF NEBRASKA - CONSERVATION AND SURVEY DIVISION - V. H. DREESZEN, DIRECTOR

view with alarm the steady expansion of irrigation activities upstream on the Platte and its tributaries.¹¹⁷ During the years when

Lincoln's well fields at Ashland which is derived from the Loup, Elkhorn and Platte River Basins. Figure 3 shows monthly distribution.



117. Speech by Clarence A. Lewis, Jr., Supervisor of Civil Engineers in Charge of Planning, U.S. Bureau of Reclamation, Grand Island, Neb., office, to the Hamilton County Groundwater Conservation Dist. at

there was no immediate necessity for greatly expanded supplies, these diversions posed no threat and took place without strenuous opposition. The situation is different now. Any upstream usage which poses the likelihood of a dry Platte River for an extended length of time undoubtedly will be met with vigorous resistance.

The situation is clear. Water for cities must be assured, and the municipalities in the lower Platte Valley represent such a sizeable proportion of the state's population that political pressure will increase in the future. Municipal supply problems can best be placed in perspective by examining past efforts to obtain firm water rights.

The first principal move directed toward insuring municipal use occurred in 1948 when Lincoln filed an application with the Department of Water Resources for an appropriation of underground water for its well field located on the banks of the Platte River at Ashland. Later Fremont, Grand Island and the Omaha Metropolitan Utilities District also filed. The applications were based on the rule of subflow which provides that water percolating through the banks and bed of a stream and flowing in connection with the watercourse is subject to appropriation in the same manner as surface water.¹¹⁸ The applications were accepted and filed by the department with the understanding that they probably would not be granted. The position of the department's director has always been that only waters of a natural stream are subject to appropriation in Nebraska and he has construed the words natural stream to mean "natural stream flows."¹¹⁹ For example, in a 1961 speech before the Nebraska Irrigation Association, the director discussed the growing concerns of municipalities and the possibility of granting them permits to appropriate water from the Platte River where the diversions would be through induced recharge of well fields. He said:

Aurora, Neb., Nov. 29, 1971; E. Reed, *The Problem of Municipal Water Supply in Eastern Nebraska*, 1962 (unpublished paper by State Geologist). The Chairman of the Lincoln City Water Advisory Bd. expressed concern in 1965 when he said: "What will be the effect in years to come of the thousands of acres of irrigation in the upper regions of the Loup River upon Lincoln's underground water supply at Ashland?" Statement by Clarence A. Davis, *Lincoln Journal*, Jan. 21, 1965, at 10, col. 2.

118. See Harnsberger at 737 n.56. One of the best explanations appears in *Maricopa County Municipal Water Conservation Dist. No. 1 v. Southwest Cotton Co.*, 39 Ariz. 65, 96-97, 4 P.2d 369, 380-81 (1931).
119. The Nebraska Constitution and state statutes dedicate the use of water of every natural stream to the people of the state and then provide that the right to divert unappropriated waters thereof shall never be denied except when such denial is demanded by the public interest. NEB. CONST. art. XV, §§ 5, 6; NEB. REV. STAT. §§ 46-202, -235 (Reissue 1968).

We have not felt that this can be accomplished under existing laws and procedures, which provide for the actual taking of water from the stream in an amount not to exceed that which may be used beneficially and with the water being measured through a device approved by the department.¹²⁰

By the 1960's vast sums had been spent by the cities on water facilities and in planning ahead for twenty-five years or more of projected growth. Further, events had taken place which focused attention on the insecurity of the cities' water rights and their investments. One of the most significant events took place in 1957 when proceedings were commenced in the Hall County District Court to restrain Grand Island from depleting groundwater levels. The plaintiffs claimed that because of the city's transportation of water to points outside the reservoir area they had to deepen their irrigation wells and install additional pumping equipment. They also alleged their lands no longer received the benefits of sub-irrigation. The issues were never judicially resolved because the city purchased the property, but the attorney for the plaintiff landowners told the 1961 Nebraska Irrigation Association convention at Norfolk that the "problems involved were complex and of great magnitude."¹²¹ He then analyzed the problems at some length. This speech and an article on groundwater in the June 1963 issue of the *Nebraska Law Review*¹²² forcefully explained that future municipal developments might be costly if land purchases, or eminent domain proceedings and payment of just compensation, had to be made in every case.

2. *Insecurity Under Judge-Made Rules*

Municipal concerns brought three questions into focus. First, what was the law governing municipal pumping and transportation of water for sale at distant places? Second, if the law was unfavorable, to what extent would municipal investments and water facility bonds be jeopardized? Third, in the event of jeopardy, what should be done? The answer to the first question was clear. Under the American rule of reasonable use, an overlying landowner cannot transfer water outside the basin onto non-local land or sell it to distant customers if other overlying landowners are injured.¹²³ It has been pointed out that this is an effective way to

120. PROCEEDINGS at 50 (1961). See also Harnsberger at 736-37.

121. PROCEEDINGS at 26 (1961).

122. Harnsberger at 736-39.

123. See *Cohen v. La Canada Land & Water Co.*, 151 Cal. 680, 91 P. 584 (1907); *Glover v. Utah Oil Refining Co.*, 62 Utah 174, 218 P. 955 (1923); *Higday v. Nickolaus*, 469 S.W.2d 859, 866 (Kansas City, Mo., App. 1971).

stop large uses because exporting water necessitates big projects to make them economical.¹²⁴ Such diversions are enjoined to the extent they interfere with beneficial uses on overlying property even though made before the overlying owners began using the water beneficially.¹²⁵ Further, it is irrelevant that the city's use on lands outside the reservoir is reasonable or beneficial. Exportation of groundwater for distant use is per se unreasonable.

Among the numerous cases illustrating this rule, *Volkman v. City of Crosby*¹²⁶ is typical. The city sank a well near plaintiffs' farm; eventually the flow of the farm well ceased entirely and it became necessary to haul water to supply the requirements of domestic use and the livestock. The court said:

The purpose for which the water drawn from the Volkman well is used is a reasonable use connected with and beneficial to the farm on which the well is located. The purpose for which the water from the City well is used has no connection with the land on which the well is located. The use is not beneficial to that land. It is piped to the city which is not located above the source of supply where it is used for municipal purposes and for sale to individuals.

The court also cited language from an earlier decision, *Canada v. City of Shawnee*:

We cannot escape the conclusion that the rights of these citizens have been seriously infringed upon, and that it is the duty of this court to as zealously guard the rights of the individual as it is to facilitate the needs of the municipality. The inhabitants of the city must have water, but by our statutes and Constitution the city is afforded a means of obtaining it without pauperizing those innocent private citizens who have devoted their lifetimes to improving, developing, and maintaining their homesteads.¹²⁷

In *Volkman* a judgment for damages against the city was affirmed. In a number of other decisions the plaintiff has been granted injunctive relief.¹²⁸

Under the correlative rights rule as interpreted by the California courts,¹²⁹ the cities would be in the same unfavorable situation

124. CORKER at vii.

125. *Erickson v. Crookston Waterworks, Power & Light Co.*, 110 Minn. 481, 111 N.W. 391 (1907); *Forbell v. City of New York*, 164 N.Y. 522, 58 N.E. 644 (1900); *Canada v. City of Shawnee*, 179 Okla. 53, 64 P.2d 694 (1937).

126. 120 N.W.2d 18 (N.D. 1963).

127. 179 Okla. 53, 57, 64 P.2d 694, 700 (1937).

128. For citations, see *Jarvis v. State Land Dep't*, 104 Ariz. 527, 531, 456 P.2d 385, 389 (1969).

129. For comprehensive discussions and collections of cases on the correlative rights doctrine, see HUTCHINS at 431-66; NATIONAL RESOURCES PLANNING Bd., STATE WATER LAW IN THE DEVELOPMENT OF THE WEST

as under the reasonable use doctrine. Under the California doctrine waters not needed by basin landowners are surplus and may be appropriated outside the reservoir area for use on lands or for public utility services.¹³⁰ Appropriations are made by diversion and use, not under the Water Code; and as between appropriators the one prior in time is entitled to take all the water he needs up to the quantity he has taken in the past before a later appropriator can take any.¹³¹ Thus appropriation means that the use is either on nonoverlying lands or for public supplies, regardless of whether the lands receiving the public service are over the reservoir. As stated by Mr. Hutchins:

Public use of percolating water is a nonoverlying use, whether the lands that receive such public service are overlying lands or whether they are located outside of the groundwater area. Such public use is therefore an appropriative use of the water.¹³²

Since appropriative rights in California may vest if they have existed for the prescriptive period,¹³³ some California cities have been assured of a legally protected supply.

Generally, the reasonable use and correlative rights rules are unfavorable to pumping and merchandising groundwater. Unlike the common law rule of absolute ownership which permitted pumping and transportation of the water anywhere for use or sale,¹³⁴ water under the other doctrines is not a free good and cities

73-74 (1943); Hutchins, *Trends in the Statutory Law of Groundwater in the Western States*, 34 TEX. L. REV. 157, 163-65 (1955); H. ROGERS & A. NICHOLS, *WATER FOR CALIFORNIA* (2 vols. 1967). The rules are set out in the syllabi of *Burr v. Maclay Rancho Water Co.*, 154 Cal. 428, 98 P. 260 (1908).

130. *City of Pasadena v. City of Alhambra*, 33 Cal. 2d 908, 207 P.2d 17 (1949).

131. *City of San Bernardino v. City of Riverside*, 186 Cal. 7, 26-28, 198 P. 784, 792-93 (1921).

132. HUTCHINS at 458.

133. H. ROGERS & A. NICHOLS, 1 *WATER FOR CALIFORNIA* 328, 365 (1967). In *City of Pasadena v. City of Alhambra*, 33 Cal. 2d 908, 207 P.2d 17 (1949), the court held appropriations lowering the natural water table thus causing an overdraft invade the rights of overlying owners and prior appropriators; and prescriptive rights vest to the extent such invasions continue during the statutory period. Even without proven present injury, the cause of action arises with the first overdraft. In the *Pasadena* case, the court completely adjudicated the rights of the larger users in the Raymond Basin of Los Angeles County, restricted all parties to a proportionate reduction of the amounts they had pumped, limited annual withdrawals from the basin to safe yield, appointed a water master, and kept jurisdiction to enforce the decree.

134. Harnsberger at 727. *City of Corpus Christi v. City of Pleasanton*, 154 Tex. 289, 276 S.W.2d 798 (1955).

using it run the risk of being completely enjoined¹³⁵ or subjected to judgments for large damages. With this realization pressures mounted for Grand Island, Lincoln and Omaha to seek protective legislation. Grand Island had plans to invest during 1963 and 1964 over two million dollars, financed by revenue bonds, for eight wells, a pumping station and water transmission lines. Even with these investments, problems of additional future expansion still had to be met. Likewise, Lincoln's source of water on the Platte River was regarded as the only adequate and economically sound one.¹³⁶ Its planners, like those in Grand Island, sought legislative action to secure municipalities' water rights.

3. *Omaha's Leadership in Obtaining Enactment of the City, Village and Municipal Corporation Ground Water Permit Act*

Of all the municipalities in the state, Omaha was the most concerned. By 1962, tremendous growth to the south and west made it infeasible to continue transporting water from its Florence Treatment Plant on the Missouri River. Further, the only practical place for an additional intake was downstream from existing sewer outlets. In addition to various engineering problems, the water would have required more extensive treatment than was considered desirable. Therefore in 1962 the Metropolitan Utilities District of Omaha appeared before the Nebraska Legislative Council on Water Control to explain its predicament.¹³⁷

135. In *Jarvis v. State Land Dep't*, 104 Ariz. 527, 456 P.2d 385 (1969), an injunction was granted prohibiting the transport of groundwater over state lands from overlying lands to Tucson by pipeline. The action closed down practically all of a 15-mile pipeline delivery system for the city. In *Jarvis No. 2*, 106 Ariz. 506, 479 P.2d 169 (1970), the court agreed to modify its injunction if Tucson purchased or acquired lands within the pumping area. It said the city could then withdraw an amount equal to the annual historical maximum use upon the lands so acquired. For a brief discussion of the decision, see 4 *Rocky Mt. Mineral L. Newsletter* 2-3 (No. 5, July 1971).

136. *BLACK & VEATCH REPORT, WATER WORKS IMPROVEMENT FOR LINCOLN, NEBRASKA* (1964). See *Lincoln Star*, May 16, 1964, at 1, col. 2. The Kansas City consultants, Black & Veatch, emphasized pursuit of water rights, including surface flow, to assure flow in the Platte River at Ashland at all times, and permission of minimum diversions from the aquifer so the city could store water. The report even said, "Obtaining water from the Missouri [River] at present appears fantastic but may become necessary if the Platte River flow is reduced to where city wells cannot meet demand." The Missouri River plan involved pumping water from the Missouri to a point near Waterloo where it would be conveyed by the Platte River channel and utilized by induced filtration at the Ashland well field. Cost was estimated at \$20 million.

137. 114 Neb. Legis. Council Rep. 18 (1962).

By 1980, peak needs would be about 205 million gallons per day (mgd) and the city was preparing to meet the demand by (1) issuing seventeen million dollars in revenue bonds to finance a plant which would eventually be expanded to cost thirty million dollars; (2) establishing a new well field on a large tract near the Platte River; and (3) putting in 8.4 miles of sixty-inch pipeline and 6.7 miles of fifty-four inch pipe to transport a daily capacity of sixty million gallons. Recognizing the insecurity of its rights under the common law rules of reasonable use and correlative rights,¹³⁸ Omaha conditioned its pursuit of this large-scale project on a legislative grant of minimal legal rights necessary to safeguard its proposed capital expenditures.¹³⁹

Omaha presented a proposed legislative bill that was designed to adopt the doctrine of subflow and to provide that the underground waters in the valleys of the Platte, Loup and Elkhorn "shall be presumed to be water of such streams."¹⁴⁰ According to the committee, the effect of the bill would have been "to require all persons in these valleys to get permits from the Department of Water Resources, and get an appropriation of so much water, before they could pump the underground waters."¹⁴¹ Based largely on this bill and modifications suggested by Omaha, Senator Moulton of Omaha and Senator Orme of Lincoln introduced L.B. 440 in the legislature on January 28, 1963. Its principal features were threefold: (1) underground waters within one-half mile of any river bank were subject to appropriation in the same manner as water in lakes and streams; (2) existing groundwater diversions by municipalities were confirmed and given a priority from the date use commenced; and (3) "domestic use" was defined to include the "use of underground water by or for municipalities and the inhabitants thereof."¹⁴²

138. Under the reasonable use rule adopted by the Nebraska Supreme Court, transportation of underground water from a municipality's extraterritorial land to within the corporate limits is unlawful whenever injury results to landowners over the common source of supply. Speech by G. H. Seig, Attorney, Omaha Metropolitan Util. Dist., Annual Meeting of Neb. Municipalities, Sept. 20, 1962. For a collection of cases, see Annot., 55 A.L.R. 1385, 1404 (1928). See also *Kock v. Wick*, 87 So. 2d 47 (Fla. 1956) (whether extracting water for distribution and sale outside of basin is reasonable is a fact issue); *Volkman v. City of Crosby*, 120 N.W.2d 18 (N.D. 1963); *City of Enid v. Crow*, 316 P.2d 834 (Okla. 1957); *Canada v. City of Shawnee*, 179 Okla. 53, 64 P.2d 694 (1937); *Rothrauff v. Sinking Spring Water Co.*, 339 Pa. 129, 14 A.2d 87 (1940); *Harnsberger* at 738.

139. 114 Neb. Legis. Council Rep. 18 (1962).

140. *Id.* at 20.

141. *Id.* at 21.

142. L.B. 440, 73d Neb. Leg. Sess. (1963).

L.B. 440, intended to safeguard municipalities in transporting groundwater from a river valley for use in a city or village at some distant location, was highly objectionable to irrigators, particularly those diverting groundwater.¹⁴³ Therefore, during February a special fifteen member legislative committee was formed to draft a bill incorporating compromises by both the irrigators and municipalities.

The special committee prepared and the the legislature thereafter adopted the 1963 City, Village and Municipal Corporation Groundwater Permit Act.¹⁴⁴ It authorizes the Director of Water Resources to grant permits to municipalities to locate, develop, transport and use groundwater, and to utilize groundwater reservoirs for storage of surplus waters. A municipality is not required to obtain a permit, but there are certain advantages for those which secure one. They would apparently gain a priority over other cities and towns without a permit, but no advantage timewise could be acquired relative to users of a different class, e.g., farm irrigators.¹⁴⁵ The important reason for obtaining a permit, however, coincides with a main purpose of the Act which is to preclude issuance of injunctions and to limit the remedy of landowners to damages for any harm they sustain as a result of municipal diversions away from lands overlying the common reservoir.¹⁴⁶ As of Sep-

143. PROCEEDINGS at 24 (1963).

144. L.B. 769, 73d Neb. Leg. Sess. (1963), now NEB. REV. STAT. §§ 46-638 to -650 (Reissue 1968).

145. Technically a distinguishing feature of an appropriation system is dedication of the water to the state or its people, and there has been no such dedication in Nebraska. NEB. CONST. art. III, § 18 prohibits special legislation.

146. Section 1 expressly permits a municipality "to transport water into the area to be served." NEB. REV. STAT. § 46-638 (Reissue 1968). Section 10 provides: "Nothing in this act shall be construed as limiting any right of an owner of an estate or interest in or concerning land to recover damage for any injury done to his land or to any water rights appurtenant thereto." L.B. 769, 73d Neb. Leg. Sess. (1963), now NEB. REV. STAT. § 46-647 (Reissue 1968). Section 10 was copied from the Kansas act. See KAN. STAT. ANN. §§ 82a-721a (1969); *Williams v. City of Wichita*, 190 Kan. 317, 339-40, 374 P.2d 578, 595 (1962) (claimant who has not initiated actual use of water is limited to action at law against appropriator subsequently developing a supply under state permit). L.B. 769 does not refer to equitable relief, and § 10 confirms the condemnation rights of cities, villages and municipal corporations. NEB. REV. STAT. § 14-366 (Reissue 1970) (eminent domain power of metropolitan cities extends 75 miles for water purposes); NEB. REV. STAT. § 15-229 (Reissue 1970) (no distance limitations on primary cities); NEB. REV. STAT. § 19-709 (Reissue 1970) (power of first and second class cities extends to "such distance as may be necessary"). See also NEB. REV. STAT. §§ 14-1002, 14-1102, 15-501, 16-674, 17-535, 18-401 (Reissue 1970). Thus it might be con-

tember 30, 1970, twenty-nine permits had been issued under the Act.¹⁴⁷

In addition to this initial deviation from common law concepts governing groundwater, the Act has other noteworthy substantive sections. The director, for instance, may issue permits not only for new developments but also "to continue existing use of groundwater" transported out of the basin to the city. It is not clear whether this is a change in prior law. As previously noted, under the Nebraska "hybrid" rule combining the doctrines of reasonable use and correlative rights, reasonable use governs except in time of shortage when the correlative rights doctrine is applicable.¹⁴⁸ Under reasonable use, an overlying owner has a cause of action to enjoin diversions outside the basin if they adversely affect him. Priority of time in use or diversion is not relevant to the parties' rights. Under correlative rights, appropriation for use outside the basin is allowable if there is surplus water and the appropriation becomes a vested right against others who divert later for outside use.¹⁴⁹ It is impossible to predict how rigidly the Nebraska court would adhere to all the variations of the correlative rights doctrine which the California courts have developed.

Section five of the Act requires that a permit, once granted, be given a priority date as of the time the application was filed.¹⁵⁰ Under the provisions of section six, if a city were diverting and transporting groundwater prior to the Act and requested a permit before April 1, 1965, the date relates back to the first day of beneficial use.¹⁵¹ For example, Lincoln's permit for an average daily use of thirty million gallons and a maximum withdrawal rate of sixty million gallons per day is retroactive to June 15, 1931.¹⁵² A 1965 law affords further protection for municipal wells by providing that no irrigation or industrial well can be drilled within 1,000 feet of a city's well.¹⁵³

cluded that the Act is legislative recognition of the doctrine of inverse condemnation. See Harnsberger, *Eminent Domain and Water Law*, in 4 *WATERS AND WATER RIGHTS* ¶ 306 (Clark ed. 1970).

147. DEP'T OF WATER RESOURCES, THIRTY-EIGHTH BIENNIAL REP. 1969-70, at 312 (1971).

148. *Olson v. City of Wahoo*, 124 Neb. 802, 811, 248 N.W. 304, 308 (1933).

149. See *HUTCHINS* at 454-61.

150. L.B. 769, § 5, 73d Neb. Leg. Sess. (1963), now NEB. REV. STAT. § 46-642 (Reissue 1968).

151. L.B. 769, § 6, 73d Neb. Leg. Sess. (1963), now NEB. REV. STAT. § 46-643 (Reissue 1968).

152. DEP'T OF WATER RESOURCES, THIRTY-EIGHTH BIENNIAL REP. 1969-1970 at 312 (1971). Ashland's date relates back to 1875; Fremont, 1931 for 45 mgd; Grand Island, 1926 for 41 mgd and 1963 for 78 mgd. *Id.* at 312-13.

153. NEB. REV. STAT. § 46-651 (Reissue 1968).

a. *Flaws in the Act*

Two procedural aspects of the act caused concern at the time of enactment. First, the delegation of power to the director was not accompanied by adequate standards under Nebraska law and the act was therefore probably unconstitutional.¹⁵⁴ Legislation aimed at correcting this defect was passed in 1967.¹⁵⁵

The second problem area related to notifying parties who might be affected by the granting of permits. The act requires that notice of the hearing to determine whether a permit shall be granted must be published for three successive weeks in a legal newspaper in each county containing any of the proposed wells.¹⁵⁶ There is no provision for notice by mail or any other form of personal notice. The constitutionality of this procedure is questionable and it would appear that permits granted under the act are invalid. In *Schroeder v. City of New York*,¹⁵⁷ the Supreme Court of the United States considered a case in which the city had commenced condemnation proceedings of a riparian owner's interest located approximately twenty-five miles downstream from the point of diversion. In holding publication for six weeks in four different newspapers and posting notices along the river but not on the Schroeder property insufficient, the Court said that notice by publication is not enough with respect to a person whose name and address are known or easily ascertainable and whose legally protected interests are directly affected by the proceedings in question. The Court also stated, "We hold that the newspaper publications and posted notices in the circumstances of this case did not measure up to the

154. L.B. 769, § 5, 73d Neb. Leg. Sess. (1963). See Judge Spencer dissenting in *Metropolitan Utils. Dist. v. Merritt Beach Co.*, 179 Neb. 783, 802, 140 N.W.2d 626, 638 (1966).

155. See NEB. REV. STAT. § 46-642 (Reissue 1968). The amendment provides that before the director issues a permit, he must find that the withdrawal of the water and its transportation by the municipality is reasonable, is not contrary to conservation and beneficial use of groundwater, and is not otherwise detrimental to the general welfare. Neb. Laws c. 284, § 1 (1967). The standard for appropriations from natural streams appears in NEB. REV. STAT. § 46-235 (Reissue 1968). See also NEB. REV. STAT. § 46-229 (Reissue 1968) which refers to a beneficial or useful purpose.

156. NEB. REV. STAT. § 46-640 (Reissue 1968).

157. 371 U.S. 208 (1962). See also *Armstrong v. Manzo*, 380 U.S. 545 (1965) (adoption proceedings void where no notice of any kind given child's father); *Nelson v. City of New York*, 352 U.S. 103 (1956); *Covey v. Somers*, 351 U.S. 141 (1956) (tax lien foreclosure following notice by mail, posting and publication void when authorities knew owner incompetent without protection of a guardian); *Mullane v. Central Hanover Bank & Trust Co.*, 339 U.S. 306 (1950).

quality of notice which the Due Process Clause of the Fourteenth Amendment requires."¹⁵⁸

The Nebraska statutes now require that in court actions and in certain other proceedings a copy of the published notice be mailed "to each and every party appearing to have a direct legal interest in such action or proceedings whose name and postoffice address are known. . . ."¹⁵⁹ This safeguard should be extended explicitly to hearings before the Director of Water Resources.

b. *Litigation Under the Act*—MUD v. Merritt Beach Co.

Pursuant to the Act, on February 19, 1965, the Metropolitan Utilities District of Omaha (hereinafter called MUD) filed its application for a permit to withdraw an average of forty mgd, with a maximum of sixty mgd, from wells on the north bank of the Platte River and on an adjacent island.¹⁶⁰ This site, close to the confluence of the Platte and Missouri Rivers, is ideal for pumping large quantities of high quality water. For example, MUD's thirty-seven wells spaced on 400 foot centers can each produce an average of 1400 gpm.

At the hearing on the application, evidence was presented showing that eighty percent or more of the water from the proposed well field would come from the Platte River through induced recharge. Nevertheless, the director treated the water involved as groundwater. With respect to the claims of some of the objectors that the contemplated withdrawals would lower their water levels, the director found that withdrawal of sixty mgd (approximately ninety-three cubic feet per second) would lower the Platte River less than one and one-fourth inches at the time of the lowest recorded discharge (240 cubic feet per second on September 3, 1955) and that the stream would be lowered considerably less at the higher discharges which generally prevail. In addition, the director found that the water wells owned by those objectors whose properties were not being condemned were beyond the influence of withdrawals from the proposed MUD wells. Therefore, on June 9, 1965, he granted the application¹⁶¹ after expressly stating that he had given no consideration to the objection that the diversions were illegal because water was being transported from one watershed to another.

158. 371 U.S. at 211.

159. NEB. REV. STAT. §§ 25-520.01 to -520.02 (Reissue 1964).

160. *In re Matter of Application 10538*, Dep't of Water Resources, State of Nebraska, order dated June 9, 1965.

161. *Id.* The priority date was set as Feb. 19, 1965.

Five of those filing objections to the application appealed to the Nebraska Supreme Court. In *Metropolitan Utilities District v. Merritt Beach Co.*,¹⁶² the court upheld the granting of the permit on the theory that no appropriators, riparians or users of groundwater had proven they would be harmed. Thus, they had no basis upon which to challenge the order. Although the case was decided on the theory that the alleged damages were speculative, the court considered a number of questions. Among these were whether the water to be taken by MUD was groundwater or water from a stream, whether the diversions interfered with vested riparian rights and rights of property owners to groundwater levels in the area, and whether the diversion of water from one basin to another was sustainable under Nebraska law.

The court held that under the evidence and circumstances of the case the transbasin diversion was reasonable, for a public purpose and in the public interest. The court also decided that the diversions did not interfere with existing rights. The more technical question and a major issue was whether the water pumped from the wells was groundwater. If not, the MUD permit was invalid. The court answered in the affirmative even though the undisputed evidence was that to replace the sixty mgd to be pumped from the aquifer, four mgd would be groundwater and fifty-six mgd would be from surface waters of the Platte River. The court's conclusion therefore rested on a literal reading of the 1963 statute which defines groundwater in Nebraska as "that water which occurs or moves, seeps, filters, or percolates through the ground under the surface of the land."¹⁶³ That this was of critical importance is indicated by the court's statement, "All of the water will be pumped from the ground, a direct diversion of water from the river not being contemplated."¹⁶⁴

Thus interpreted, the 1963 definition of groundwater seems to eliminate the possibility of adopting the doctrine that subflow is

162. 179 Neb. 783, 140 N.W.2d 626 (1966).

163. NEB. REV. STAT. § 46-635 (Reissue 1968). Compare the Montana statute which explicitly includes subflow within the definition of ground water. "'Groundwater' means any fresh water under the surface of the land including the water under the bed of any stream, lake, reservoir or other body of surface water." MONT. REV. CODES ANN. § 89-2911 (Supp. 1971).

164. *Metropolitan Utils. Dist. v. Merritt Beach Co.*, 179 Neb. 783, 787, 140 N.W.2d 626, 630 (1966). Judge Spencer dissented from this view. He said undisputed testimony indicated the water moved from the Platte River to the wells under artificial gradient; therefore, he claimed the majority ignored the obvious when describing the water as groundwater and concluding "no water is taken directly from the river." 179 Neb. at 803, 140 N.W.2d at 638.

subject to appropriation as though it were part of a stream. Towns and cities seeking to protect their well fields are now restricted to obtaining permits under the City, Village and Municipal Corporation Groundwater Permit Act. These permits, because of their limited applicability, afford no security against surface or groundwater users¹⁶⁵ except other municipalities with later priorities.¹⁶⁶

In addition to eliminating municipal well fields from the protection afforded under the appropriation system, the statutory definition of groundwater removes the flexibility which courts previously had under the law governing underground streams. Before adoption of the groundwater definition, the law applicable to surface watercourses determined the rights of owners when groundwater was a tributary to a stream.¹⁶⁷ In *Olson v. City of Wahoo*, the Nebraska Supreme Court indicated that water traveling through gravel in the Todd Valley, formerly the bed of the Platte River, from Morse Bluff to near Ashland, had a known and well-defined channel and was therefore an underground stream.¹⁶⁸

Whether the distinction between percolating waters and underground streams is of major significance in Nebraska depends upon whether the supreme court applies the reasonable use rule or the correlative rights doctrine when a dispute between neighboring users finally comes before it. If the correlative rights doctrine is followed, there can be a judicial apportionment. On the other hand, if the court follows the reasonable use rule the classification could be the pivotal point because the underground stream rule, although unrealistic to hydrologists,¹⁶⁹ does permit a court to apportion subterranean water in some situations where it might otherwise be unable to do so under the rules for percolating water.¹⁷⁰

States differ in their handling of the matter. For instance, California recognizes that a definite underground stream is subject to riparian rights,¹⁷¹ and the California Water Code specifically pro-

165. NEB. REV. STAT. §§ 46-642 to -643 (Reissue 1968).

166. The Act would prohibit injunctions and limit the recovery of injured landowners to damages. See NEB. REV. STAT. § 46-647 (Reissue 1968), and note 146 *supra*.

167. Harnsberger at 731.

168. 124 Neb. 802, 810, 248 N.W. 304, 307 (1933).

169. Tolman & Stipp, *Analysis of Legal Concepts of Subflow and Percolating Waters*, 21 ORE. L. REV. 113 (1942). See also 1 CLARK at § 3.1; Wiel, *Law and Science: Their Cooperation in Groundwater Cases*, 13 S. CAL. L. REV. 377 (1940).

170. *E.g.*, *Pima Farms Co. v. Proctor*, 30 Ariz. 96, 245 P. 369 (1926); *Verdugo Canon Water Co. v. Verdugo*, 152 Cal. 655, 93 P. 1021 (1908). See *Evans v. City of Seattle*, 182 Wash. 450, 47 P.2d 984 (1935).

171. HUTCHINS at 421. See 1 CLARK at § 52.2.

vides that a subterranean stream must flow "through known and definite channels."¹⁷² Oklahoma takes the opposite view. It formerly defined groundwater as "water under the surface of the earth regardless of the geologic structure in which it is standing or moving; it does not include water flowing in underground streams with ascertainable beds and banks." The words after the semi-colon were deleted in 1967 which had the effect of removing "a material amount of water from that which had previously been available for appropriation as stream water by the public."¹⁷³

F. WATER FOR INDUSTRY

It has been predicted that the future "economic growth of the West will be identified less with irrigation and more with the use of available supplies for municipal, industrial, and recreation purposes."¹⁷⁴ Unquestionably the western states have benefited from dispersal of national firms throughout the country as a result of the interstate highway system, expanded trucking, air access, widespread accessibility of plants by employee automobile travel, and movement from large overpopulated centers.¹⁷⁵ In Nebraska there has been an increasing commitment towards industrial development and today a number of state agencies and many cities and towns actively seek to attract commercial enterprises.¹⁷⁶ Nevertheless, Nebraska business still depends primarily on agriculture and as Dorothy Switzer of the University's Bureau of Business Research has observed:

It is generally agreed that the state's industrial development depends to a considerable extent upon both the productive and the financial well-being of its agriculture. This close relationship is evidenced by year-to-year changes in the state's industrial mix as shifts are made to meet the changing needs of agriculture.

Adaptation of manufacturing to the developing needs of agriculture is dramatically illustrated by industrial response to the expansion of irrigation farming. New plants have been established throughout the state, many of them in small communities, to produce a wide range of irrigation equipment and supplies. There has

172. CAL. WATER CODE §§ 1200, 2500 (West 1971). See also H. ROGERS & A. NICHOLS, 1 WATER FOR CALIFORNIA § 248 (1967).

173. Rarick, *Oklahoma Water Law, Ground or Percolating in the Pre-1971 Period*, 24 OKLA. L. REV. 403, 424 (1971).

174. Fox, *Water: Supply, Demand and the Law*, 32 ROCKY MT. L. REV. 452, 455 (1960).

175. See ECONOMIC RESEARCH DIV. OF THE CHASE MANHATTAN BANK, BUSINESS IN BRIEF, No. 92, at 4-5 (June 1970).

176. Eighty percent of the city officials participating in a newspaper poll at the Nebraska Mayors' Conference in 1972 ranked attracting industry among the three major issues facing their communities. Omaha World-Herald, June 11, 1972, § B, at 7, col. 1.

been also a concomitant increase in the production of fertilizers and other agricultural chemicals required by irrigation farming.

The bountiful production made possible by irrigation should lead also to establishment of good markets close at home—the kinds of markets that are available when manufacturing plants are built within the state to process the food and fiber produced here. To the extent that this happens, agriculturally-related industry assures to Nebraska the “value added” by manufacturing which in turn benefits all segments of the economy.

The interrelationship of Nebraska agriculture and industry is seen also in the fact that development of geographically-dispersed manufacturing plants provides employment within the home community for rural persons displaced by farm technology and, in addition, offers the opportunity for necessary supplemental farm income for farm families whose land holdings are insufficient to return adequate income from on-the-farm sources alone.¹⁷⁷

Up to this time, water has not been a major obstacle to the establishment or location of new industries or to the expansion of existing firms in the state. Rather, its availability has been one of the key features in locating new plants. Increasingly, however, small towns have had insoluble problems in their attempts to guarantee firm supplies of groundwater to industries wanting to locate nearby. The following statement is especially applicable to present conditions in Nebraska:

There is no special competitive *advantage* to an area or community in being able to supply the water needs of a new industrial plant if the same needs can be met by a large number of other areas or communities, but there is a severe and perhaps prohibitive competitive *disadvantage* in being unable or unwilling to do so on fairly short notice with a minimum of lost motion, controversy and uncertainty. This suggests that investment in a considerable amount of excess water-supply capacity may be justifiable in small towns and rural areas where there are conditions of under-

177. D. SWITZER, *BUSINESS IN NEBRASKA* 1 (No. 323, Aug. 1971). A strong basic agricultural economy contributes to industrialization because:

- (1) Farm population is stable, in that farmers establish permanent homes and permanent communities.
- (2) Farming supplies a surplus population which can migrate to nearby urban centers and provide labor for industry.
- (3) Since agricultural employment is seasonal, it affords an off-seasonal labor supply which encourages industries that offer dovetailing of employment to create off-seasonal demands for labor.
- (4) Agriculturally supported towns and cities usually provide the early and frequently the most costly stages of community facilities, such as roads, highways, schools, health, and police protection, on which industrialization can build.
- (5) Finally, a highly concentrated agriculture generates the beginnings of mass markets around which industrialization can swing.

Folz, *The Economic Dynamics of River Basin Development*, 22 *LAW & CONTEMP. PROB.* 205, 217 (1957).

employment and low incomes, and where other conditions (such as roads, schools, medical facilities, transportation, etc.) are fairly favorable for manufacturing enterprises.¹⁷⁸

The question now is whether the people want to modify the state's existing legal framework which is unfriendly towards utilization of water for municipal and industrial purposes. A recent important dispute involving the City of Beatrice, two large fertilizer plants and nearby farmers indicates the extent of potential problems as new plants are built in rural areas.

1. *Burger v. City of Beatrice*

In the fall of 1964, Phillips Petroleum Company and Cominco Products Company, the American subsidiary of Consolidated Mining and Smelting Company of Canada, built fertilizer plants six miles northwest of Beatrice near the unincorporated village of Hoag. The Cominco plant cost twenty-two million dollars and Phillips invested approximately the same amount. Their process, extraction of nitrogen from natural gas to form a fertilizer suitable for agricultural use, requires vast quantities of water which the companies originally planned to divert and transport from the Blue River. The quality, however, was below the required standard. A groundwater source was therefore needed, and during the winter the companies sought to buy land from nearby farmers for well installations. No agreement could be reached and finally in February 1965, the city itself informed the two companies that it was willing to supply an average of eighty-five million gallons with a maximum of 180 million gallons each month. The proposed price, four cents per thousand gallons, was surprisingly low.

At the time of its offer, Beatrice had four wells near the Blue River about six miles northwest of the city limits. The wells had been drilled about 1,100 feet apart in the early 1930's on a railroad right-of-way which ran in a northwest-southeast direction across the lands of the farmers who had refused to sell to Phillips and Cominco. Capacity was six million gallons per day; two fourteen-inch pipelines carried the water into the city.

These four wells were inadequate to supply the demands of both the city and the two fertilizer plants. Consequently, on March 19, 1965, Beatrice entered into a contract with the railroad for a perpetual lease to construct additional wells and a pipeline on the right-of-way. Even with this agreement, the city needed ease-

178. Stepp, *Some Economic Aspects of Industrial Water Supply in the South*, in WATER RESOURCES AND ECONOMIC DEVELOPMENT IN THE SOUTH 28 (API Series 16, N.C. State U., Aug. 1965).

ments around the proposed installations so water could be withdrawn from beneath surrounding properties. Negotiations with the farmers to acquire the easements failed, and on April 8, 1965, the city began condemnation proceedings in the Gage County Court to prohibit any future wells within 500 feet of the city's sources, to obtain an order for removal of three existing farm irrigation wells in the vicinity, and to secure the necessary easements for withdrawing the water underlying defendants' lands. Fourteen days later the farmers sued in the Gage County District Court for an order to enjoin the city's condemnation action. After the farmers' request was denied,¹⁷⁹ they appealed to the Nebraska Supreme Court. It was during the time between the commencement of the county court action and the appeal that the city drilled four new wells on the right-of-way and installed an 18-inch pipeline from the well field to a point near the fertilizer plants. There the large pipe was connected to the existing fourteen-inch pipes and service lines were run directly to Phillips and Cominco.

In ruling for the farmers, the supreme court concluded that under this arrangement "the end is the furnishing of water for the private purposes of Phillips and Cominco for their private use in the production of commercial fertilizers for profit."¹⁸⁰ Judge Carter, writing for the majority, observed

public use means use by the public—that is, public employment—and consequently that to make a use public, a duty must devolve on the person or corporation holding property appropriated by right of eminent domain to furnish the public with the use intended, and that there must be a right on the part of the public, or some portion of it, or some public or quasi-public agency on behalf of the public, to use the property after it is condemned.¹⁸¹

Water sold to Phillips and Cominco did not fit within this rule, and the taking of the easements by eminent domain was therefore void to the extent that it was for the private benefit of the two companies. The case was remanded to the lower court with instructions to sustain the condemnation action only to the extent that a need for more water could be shown on the part of the city and its inhabitants.

179. In the county court proceedings, which the district court refused to enjoin, expert witnesses for the city testified that damages to the farmers would be nominal, *i.e.*, \$50 each. Opposing experts claimed damages were \$90,000 for the difference in value between dry and irrigated land and loss of improvements. The county court awarded the farmers \$84,900. Both sides appealed, and these appeals were still pending when the action to enjoin the proceedings reached the Nebraska Supreme Court.

180. *Burger v. City of Beatrice*, 181 Neb. 213, 223, 147 N.W.2d 784, 791 (1967).

181. *Id.* at 220, 147 N.W.2d at 790.

There is language in the opinion which, if read in isolation, would preclude condemnation by a town or city if the water could be traced to private industry.¹⁸² But a careful reading shows that the majority believed the pivotal question to be whether the city had a duty to furnish water to a particular industry. If such a duty existed, the city would be acting as a public utility and the use would be public, not private, even under the limited definition of "public use" adopted in the case.¹⁸³ The duty which would permit the furnishing of water to industrial concerns *inside* the city limits was found in section 16-681 of the Nebraska statutes. It provides:

Such city owning, operating or maintaining its own gas, water, power, light or heat system, shall furnish any person applying therefor, along the line of its pipes, mains, wires or other conduits, subject to reasonable rules and regulations, with gas, water, power, light or heat.¹⁸⁴

The conclusion in *Burger* is correct because it is difficult to rationalize a material difference between an irrigation district furnishing water to private farm owners inside the project and a city providing water to private industrial owners within its territory.¹⁸⁵ Nonetheless, the rationale of *Burger* is restrictive and important questions regarding the furnishing of water for commercial and industrial establishments outside cities and towns remain unanswered.

A commonplace posture of the legal problem arises when, as in *Burger*, both the wells and the industry are outside the city limits. Under *Burger* it is clear that cities cannot use their powers of con-

182. "When the public use is separable from the private use, the court may proceed [to permit the condemnation] as to such public use and deny the taking and compensation for the private use." *Id.* at 224, 147 N.W.2d at 792.

183. Two dissenting judges, McCown and Boslaugh, interpreted the opinion as follows:

The majority opinion apparently concedes that if there were a duty devolving on the city requiring it to furnish water to customers in the position of Phillips and Cominco, the city would then be acting as a public utility and the taking here would be for a public use. . . .

Id. at 226, 147 N.W.2d at 793 (dissent).

184. NEB. REV. STAT. § 16-681 (Reissue 1970). The dissenting judges, however, pointed out:

Not one word of that section limits the requirement to the city limits and, in fact, read literally, it does not even require the furnishing of such utility service to every inhabitant of the city, but only requires it along the line of pipes, mains, or conduits, of its water system.

Id. at 227, 147 N.W.2d at 793 (dissent). On this point, *see also* *Jacobs v. Clearview Water Supply Co.*, 220 Pa. 388, 69 A. 870 (1908).

185. *See* *Kaiser Steel Corp. v. W.S. Ranch Co.*, 81 N.M. 414, 419, 467 P.2d 986, 991 (1970).

demnation to expropriate agricultural water rights for transfer to industries outside the territorial boundaries. This view is too narrow. The matter of primary importance should be beneficial use. If beneficial use, not the particular purpose to which the water is put, becomes the focal point, then furnishing a supply to commerce and industry would be a public purpose. The matter is, of course, one of degree. There is, however, considerable merit to the broader view of the term "public use"—a view the *Burger* court rejected. Under this broader view, public use means public advantage, consequence, or benefit. Anything which tends to enlarge the resources, increase the industrial energies, and promote the productive power of any considerable number of the inhabitants of a section of the state, or which leads to the growth of towns and the creation of new sources for capital and labor, contributes to the general welfare and the prosperity of the whole community constitutes a public use.¹⁸⁶

From a societal point of view, industrial uses are essential for maintaining urban economic systems upon which the inhabitants are dependent. Great hardship, inconvenience and threat to the public welfare would occur if existing supplies were cut off.¹⁸⁷ For instance, a large percentage of the fifty billion gallons pumped each year by Nebraska municipalities supplies industrial users both inside and outside of city limits. Evidence in the *Burger* case showed Beatrice had many industrial and commercial customers inside and outside its limits,¹⁸⁸ and many other cities and towns, including Omaha, Lincoln, Grand Island, Norfolk, McCook and Nebraska City, furnish water to almost every industry in their communities.¹⁸⁹

Under what circumstances a city should be allowed to supply firms outside its borders necessitates balancing a number of considerations, including the distance of the industry from the geographic city lines, the total water supply available, the size of the city, the general economy of the area, the demands of the industry, injury to the condemnees, and the economic benefits compared to the costs.

If the time comes when pressures for industrial expansion require a change in the definition of "public use" adopted in *Burger*, the supreme court can cite language from the decision itself to justify a shift in attitude. The court said the term public use "is elas-

186. 181 Neb. at 220-21, 147 N.W.2d at 790.

187. Harnsberger at 738.

188. 181 Neb. at 228, 147 N.W.2d at 794 (dissent).

189. FRAMEWORK STUDY at 50.

tic and keeps pace with changing conditions."¹⁹⁰ The question in each case should be one of fact; a precise line should not be drawn.¹⁹¹

If the supreme court refuses to modify its definition of public use, the power of municipalities to supply industry could be expanded within the *Burger* rationale by legislation permitting expansion of a water district's territorial limits to include the city, adjacent municipalities and precincts "served in whole or in part by the common waterworks system."¹⁹² This is the present framework for metropolitan utility districts,¹⁹³ and it is well known that under this organization the Omaha Metropolitan Utilities District supplies water to many outside industries.

2. *The Stumbling Block of the Nebraska Preference Statute*

Assuming *arguendo* that the Nebraska Supreme Court will hold, when the case is squarely presented, that furnishing water for commercial purposes inside a city is a public use, the question remains whether agricultural rights can be condemned for such commercial ends. A formidable obstacle is presented by the law regarding preferences.

Preferences generally are associated with a system of prior appropriation, and therefore it was surprising when the Nebraska Legislature enacted the following groundwater preference law:

Preference in the use of underground water shall be given to those using the water for domestic purposes. They shall have preference over those claiming it for any other purpose. Those using the water for agricultural purposes shall have the preference over those using the same for manufacturing or industrial purposes.¹⁹⁴

These preferences must be distinguished from priorities which establish the order of use among those in the same class. The pur-

190. 181 Neb. at 220, 147 N.W.2d at 790.

191. See *Timmons v. South Carolina Tricentennial Comm'n*, 254 S.C. 378, 391, 175 S.E.2d 805, 812 (1970).

192. NEB. REV. STAT. § 14-1001 (Reissue 1970). No statute requires furnishing service but it can be argued that service must be provided to everyone within the boundaries of the district. See E. McQUILLAN, *MUNICIPAL CORPORATIONS* § 37.04 (1950).

193. NEB. REV. STAT. § 14-1001 (Reissue 1970).

194. NEB. REV. STAT. § 46-613 (Reissue 1968). The Nebraska Constitution contains no express reference to groundwater. It does establish a system of preferences for water in natural streams. NEB. CONST. art. XV, § 6. These preferences, i.e., domestic first, then agriculture, and lastly manufacturing, have been codified. NEB. REV. STAT. § 46-204 (Reissue 1968).

pose of a preference statute is to permit water to move from one use to another. The holder of the higher preference ordinarily exercises his right at a time when there is insufficient water to meet all needs. The owner having the superior rank on the preference scale condemns one or more uses which are lower on the list and pays just compensation. The effect is to permanently transfer ownership of the water right from the possessor of the lower or inferior use to the new owner.

In practice, an agricultural user could seldom afford to condemn industrial water use because the marginal productivity value is so much higher in the latter use. Further, the Nebraska Supreme Court has held that the right of eminent domain cannot be placed in the hands of individuals or corporations.¹⁹⁵ Therefore, even if the legislature altered the preference scale to place manufacturing or industrial uses above agriculture, neither Phillips nor Cominco, which are private companies, could have condemned the water rights of the farmers in the *Burger* decision. Consequently, the real issue is whether industries may obtain water by bringing themselves under the aegis of the eminent domain power of municipalities.

The farmers in the *Burger* case argued that an agricultural use of groundwater has a higher preference than an industrial use;¹⁹⁶ while towns and cities are empowered to condemn private water rights for "municipal needs," the power is nonexistent when the municipality plans to supply agricultural water to a commercial concern.¹⁹⁷ Under this view, Beatrice could not have taken agricultural rights for the use of Phillips or Cominco even if the two plants had been inside the city. It was unnecessary, however, for the court to decide this point because the case was disposed of on the basis of what constitutes a public use.

Because domestic utilization is the highest preference, a city acts for a public purpose when it condemns agricultural or industrial water to supply the domestic needs of its residents.¹⁹⁸ After the Metropolitan Utilities District of Omaha complained in 1962 that the term "domestic use" had never been defined and was un-

195. *Vetter v. Broadhurst*, 100 Neb. 356, 160 N.W. 109 (1916). *Contra*, *Clark v. Nash*, 198 U.S. 361 (1905). For a discussion of private undertakings as public uses, see 4 CLARK § 303.

196. Brief for Appellant at 67-70, *Burger v. City of Beatrice*, 181 Neb. 213, 147 N.W.2d 784 (1967).

197. 4 CLARK at 85-86.

198. *Burger v. City of Beatrice*, 181 Neb. 213, 223, 147 N.W.2d 784, 791 (1967).

clear,¹⁹⁹ the legislature specified in 1963 that domestic use in connection with groundwater means all uses required for human needs as it relates to health, fire control and sanitation.²⁰⁰

Municipal use, however, has never been defined and it is not referred to in the Nebraska preference statute. The persistent refusal by the legislature to define municipal use represents a deep-rooted attitude in the state which opposes favoring industry over agriculture in any conceivable situation. As early as 1903 the Nebraska Supreme Court in *Crawford v. Hathaway*²⁰¹ held that the statutory preference in favor of domestic purposes does not extend to furnishing water for general municipal use. The court said that domestic use does not include utilization of a supply for sprinkling city streets, providing power for a municipal lighting plant or flushing sewers at a military post. Its view was that any considerable interference with the rights of a riparian proprietor would render the agricultural use worthless.

After lengthy debate, the delegates to the constitutional convention of 1920 refused to approve a proposal that municipal use be preferred over all others except domestic.²⁰²

Most states have had a different philosophy. The usual order of preference is: (1) domestic and municipal; (2) agriculture; and (3) manufacturing.²⁰³ Even if Nebraska granted priority to municipalities, the use of eminent domain power to obtain industrial water would still remain a problem. Although municipal use is broader than domestic use, commercial enterprises probably would not be included. Generally recognized city purposes are fire fighting, supplying homes and public buildings, and flushing sewers. As Professor Frank Trelease points out, "But most of the so-called municipal purposes are in fact uses by the inhabitants of the community and the industrial enterprises there located."²⁰⁴ For example, 65.4 percent of Omaha's water supply is used by industry; the stockyards industry alone accounts for fifteen percent.²⁰⁵

199. 114 Neb. Legis. Council Rep. 19 (1962).

200. Neb. Laws c. 279, p. 836 (1963), now NEB. REV. STAT. § 46-613 (Reissue 1968). The definition also includes use of groundwater for domestic livestock related to normal farm and ranch operations.

201. 67 Neb. 325, 93 N.W. 781 (1903).

202. JOURNAL OF THE NEBRASKA CONSTITUTIONAL CONVENTION at 1917 (1919-20). Pertinent portions of convention debate are reproduced in the *Report of the Special Committee on Water Resources*, 19 NEB. ST. BAR J. 63, 67-68 (1970).

203. See MEYERS & TARLOCK at 205.

204. Trelease, *The Concept of Reasonable Beneficial Use in the Source of Surface Streams*, 12 Wyo. L.J. 1, 9 (1957).

205. See PROCEEDINGS at 48 (1970).

3. *Proposals to Aid in Future Municipal Planning*

Although Nebraska cities have broad powers to acquire water supplies, several matters essential to future planning have never been resolved. This creates considerable uncertainty when attempts are made to look ahead and anticipate growth. To afford stability, greater legal security should be provided to municipalities and industries.

If more protection is to be granted, what changes should be made? First, municipal use should be defined and its place in the preference statute established.²⁰⁶ The Commissioner of Utilities for the City of Grand Island has forcefully pointed out that two of the state's principal problems are competition between pump irrigators and municipalities for water and the absence of a definition or preference for municipal use.²⁰⁷ The specification of municipal use should include utilization for domestic purposes and for sustaining human and domestic animal life, fire fighting, sanitation, lawn watering, public fountains and lakes, maintenance of municipal parks, golf courses and similar areas, recreational activities, supplying public buildings, production of steam, cooling, refrigeration, air-conditioning, and laundries.²⁰⁸

Commercial and industrial uses which are essential for the maintenance of the community's economy should also be given a

206. The water laws of South Dakota, S.D. COMP. LAWS 46-1-6(5) (1967), contain the following definition of "municipal use":

the use of water by the state through its institutions, facilities and properties or a municipality, and the inhabitants thereof, whether supplied by the government or by a privately owned public utility or other agency, primarily to promote the life, safety, health, comfort, and business pursuits of the state, municipality and inhabitants thereof. It does not include the irrigation of crops on a commercial scale, even within the limits of the state institution, facility, property or municipality. Nor does it include large recreational uses such as lakes.

Nebraska has defined the "domestic use" of groundwater, NEB. REV. STAT. § 46-613 (Reissue 1968). It also would appear desirable to enact other definitions, i.e.: "Agricultural use" means the use of groundwater for maintaining and raising crops, livestock and fowl, and shall include, but not be limited to, water used for irrigation of crops and pastures, watering stock and fowl, and maintaining sanitation of agricultural equipment and buildings; "industrial use" means use of groundwater for the operation and maintenance of any commercial or industrial enterprise, including any water for the personal needs of employees while at work, heating and cooling of facilities and any uses ancillary to the functioning of such enterprise.

207. 150 Neb. Legis. Council Rep. 15-16 (1966).

208. See Trelease, *The Concept of Reasonable Beneficial Use in the Law of Surface Streams*, 12 Wyo. L.J. 1, 9 (1957).

statutory preference. In Texas, for instance, the usual list is reversed and preferences are given in the following order: (1) domestic and municipal uses, including water for sustaining human life and the life of domestic animals; (2) water to be used in processes converting lower value materials into a form having greater usability and commercial value, including water necessary for the development of electric power by means other than hydroelectric; (3) irrigation; (4) mining and recovery of minerals; (5) hydro-electric power; (6) navigation; (7) recreation and pleasure; and (8) other beneficial uses.²⁰⁹

If our goal is to use water for its highest beneficial purpose, preferences should be given on economic rather than political grounds. Clayton Yeutter, former administrative assistant to Governor Norbert Tiemann and an authority on state water law, argued in 1965 that the Nebraska preference scale reflects outdated economic conditions and should be changed to recognize marginal value productivity.²¹⁰ The only exception would be domestic use where the issue is survival, not economics. Some jurisdictions, such as Nevada²¹¹ and New Mexico, have no preferences. Washington statutes give any person the right to condemn any property or right necessary to make a beneficial use of water, but in the eminent domain proceedings "the court shall determine what use will be for the greatest public benefit, and that use shall be deemed a superior one."²¹² The Washington innovation has been correctly described as "meritorious,"²¹³ and it has been suggested that a modified version of the procedure might well be adopted in Nebraska.

In Nebraska the Director of the Department of Water Resources, rather than a judge, should make the initial determination of highest use, subject to appeal directly to the supreme court.²¹⁴ If such

209. TEX. REV. CIV. STAT. art. 7471 (1954).

210. Yeutter at 31. Compare NEBRASKALAND, May 1972, at 5 (editorial by Willard R. Barbee, Director, Neb. Game & Parks Comm'n).

211. NEV. REV. STAT. § 534.120(2) (1967) authorizes the state engineer to designate preferred uses in groundwater areas declared to be in a state of depletion.

212. WASH. REV. CODE ANN. § 90.03.040 (1962).

213. Ohrenschall & Imhoff, *Water Law's Double Environment: How Water Law Doctrines Impede the Attainment of Environmental Enhancement Goals*, 5 LAND & WATER L. REV. 258, 279 (1970). Another possibility is to establish different preferences in groundwater areas which have been declared "critical," or which have particular geographic conditions or special economic priorities. See Marquis, Freeman & Heath, *The Movement for New Water Rights Laws in the Tennessee Valley States*, 23 TENN. L. REV. 797, 835 (1955).

214. See Yeutter at 50-51.

a system were adopted, the director should consider a number of factors. These include the extent to which competing uses may be detrimental to the public interest,²¹⁵ the direct marginal productivity of the uses,²¹⁶ the benefits to be derived by the state and the locality from the ensuing economic activity,²¹⁷ how specific uses fit into the overall State Water Plan, and opportunities foregone by permitting some uses which preclude others. Consideration must also be given to scenic values and recreational uses such as fishing, boating, swimming, sailing and skiing.²¹⁸ Ecological considerations, including the effect of different uses on fish and wildlife, merit a prominent place in the decision making process.

A study should be undertaken to determine who gains from the existing Nebraska preference law, what the costs of preferences are to the state-wide community, and whether preferences are essential for progress and a stable economy. If the costs of keeping water in less profitable enterprises are high, the question of departing from the criterion of economic efficiency should be examined. Agriculture is the number one claimant to water in most of the state and its long established uses must be considered in any reconciliation of conflicting interests. Nevertheless, since urban populations cannot grow without an expanding business sector providing employment, the pressing demands of industry should not be ignored.

The use of groundwater by Nebraska cities and industries is so small that the elimination of all groundwater preferences would not have widespread effect.²¹⁹ Economic data shows that water used in industry brings far greater returns than water used for irrigation. Thought should therefore be given to setting up an institutional framework permitting water to move to its highest bene-

215. This standard appears in NEB. REV. STAT. §§ 46-235 to -642 (Reissue 1968).

216. Yeutter at 51-52.

217. Cf. ORE. REV. STAT. § 537.170 (1971).

218. *E.g.*, in terms of visitor days, recreational use on Bureau of Reclamation projects increased 721% from 6.6 million in 1950 to 54.2 million in 1970. SNOW, *Recreation Land and Our Responsibility*, in RECLAMATION ERA 29 (May 1972). Nebraska studies include BUREAU OF SPORT FISHERIES AND WILDLIFE, U.S. DEP'T OF THE INTERIOR, REPORT ON FISH AND WILDLIFE RESOURCES IN RELATION TO PAPILLION CREEK AND TRIBUTARIES PLAN (June 1967); BUREAU OF OUTDOOR RECREATION, U.S. DEP'T OF THE INTERIOR, A SURVEY SCOPE REPORT ON THE RECREATION ASPECTS OF THE LOWER PLATTE RIVER DAM AND RESERVOIR PROJECT, NEBRASKA (July 1968); NEBRASKA GAME AND PARKS COMM'N, OUTDOOR RECREATION FOR NEBRASKA (3 vols., 1968).

219. See F. SHAFFER, AVAILABILITY AND USE OF WATER IN NEBRASKA, 1970 at 46 (U. of Neb. Conservation & Survey Div. Water Survey Paper No. 31, March 1972).

ficial use. Any taking should be under the power of eminent domain given municipalities. The effect would be that individual firms which could not themselves condemn water rights would indirectly buy agricultural rights and put the water to a use which would fulfill the economic principle of maximization. At least the legislative obstacle of preferences would be removed and the issue would then turn, as it did in the *Burger* case, on whether a particular taking is for a public purpose.

In addition to the uncertainty about obtaining adequate supplies for industrial development, municipalities also face the problem of acquiring rights for future growth. Cities such as Omaha and Lincoln can buy large tracts of land for future wells and lease the mining rights for sand and gravel, but they have no statutory right to condemn and hold water rights for the future. Present reservations for later use can save large sums, and various state statutes take different approaches to assure that cities can acquire property before owners make large capital expenditures for which compensation will later have to be paid. In Texas all permits for other than domestic or municipal use are granted subject to the right of any city, town or municipality to make subsequent appropriations for domestic or municipal purposes without the necessity of condemnation or payment.²²⁰ This in effect reserves all water used in agriculture, manufacturing and mining which was unappropriated in 1931, the date of the statute. Appropriators are given notice by the law of this Achilles heel in their permits.²²¹

A number of states also give a preference for the needs of municipalities, and authority is expressly given to reserve water for future needs.²²² The California provisions are probably more far-reaching than most. The Water Code provides that it is the established policy of the state to protect municipal rights to the fullest extent necessary for existing and future rights.²²³ Applications for a permit by a municipality for domestic purposes are first in right even though not first in time.²²⁴ If a municipality obtains permission to appropriate water in excess of its existing needs, the board may issue permits for the temporary appropriation of this excess.²²⁵ When the municipality recaptures the temporarily appropriated

220. TEX. REV. CIV. STAT. art. 7472 (1954).

221. The provision is inapplicable to international boundary streams, *i.e.*, the Rio Grande. TEX. REV. CIV. STAT. art. 7472a (1954).

222. *E.g.*, ARIZ. REV. STAT. ANN. §§ 45-143 to -147 (1956); S.D. COMP. LAWS §§ 46-5-38 to -40 (1967).

223. CAL. WATER CODE § 106.5 (West 1971).

224. CAL. WATER CODE § 1460 (West 1971).

225. CAL. WATER CODE § 1462 (West 1971).

water, it must pay just compensation for the prior handling facilities now rendered valueless.²²⁶

The Nebraska Supreme Court in the *Burger* decision recognized that the future water needs of Nebraska cities are a matter of legitimate concern when it said:

There is evidence in this record that there was and is a need on the part of Beatrice for additional water for use in emergencies, anticipated growth, and increased use by the city and its inhabitants in the future. We do not here hold that condemnation may not be proper in fulfillment of these needs.²²⁷

Despite this recognition, it is advisable to codify exactly what powers a municipality has in this area. A minimal proposal would authorize the Director of the Department of Water Resources to issue appropriations for contemplated future needs. Pending the time when the city needs the surplus, temporary permits could be given to utilize all or part of the allocation. Some specified notice in advance, perhaps six months, would be mandatory before cancellation of the temporary permits.²²⁸

4. Conclusion

Farm irrigators, the principal water users in Nebraska, probably will continue to oppose legislation for the benefit of industries and cities. For many years the Nebraska State Irrigation Association has opposed a change in the preference provisions. The resolution passed at each annual meeting states:

WHEREAS, the long standing policy set forth in the State Constitution gives the preference in use of water to those using it for domestic purposes. They shall have preference over those claiming it for any other purpose. Those using the water for agricultural purposes shall have preference over those using the same for manufacturing or industrial purposes.

WHEREAS, any change, in Nebraska's preference of water use as set forth in the State Constitution would be dangerous to irrigation and agricultural developments.

BE IT THEREFORE RESOLVED, that the Nebraska State Irrigation Association favors and promotes the maintenance of the sta-

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226. CAL. WATER CODE § 1463 (West 1971). In lieu of granting temporary permits, the board may authorize the municipality to become a public utility as to such surplus, subject to the jurisdiction of the Public Utilities Commission pending application of the entire appropriation to municipal uses. CAL. WATER CODE § 1464 (West 1971).
227. 181 Neb. at 223-24, 147 N.W.2d at 791. See also *City and County of Denver v. Sheriff*, 105 Colo. 193, 96 P.2d 836 (1939); *Beus v. Soda Springs*, 62 Idaho 1, 107 P.2d 151 (1940).
228. See S.D. COMP. LAWS ANN. § 46-5-40 (1967).

tus quo of present preference in water uses as defined in the Constitution of the State of Nebraska.²²⁹

In the long run, this opposition to change will exacerbate the strain, and the legislature will eventually be forced to consider the issues. When the time comes, it will be significant that of the forty-nine senators in the Nebraska Legislature, twelve are from Omaha and five are from Lincoln. Unlike the situation several decades ago, the future of Nebraska's resource development and allocation rests in the hands of the urban majority rather than the rural landowners. Mr. Warren Fairchild, former Executive Secretary of the Nebraska Soil and Water Conservation Commission, discussing the problem in 1969 before the Nebraska Irrigation Association said:

[M]ore significant to agricultural interests than the total population figures, is the breakdown in Nebraska between rural and urban populations during the various time frames. Today approximately 58% of the people in Nebraska live in towns of greater than 2,500 population. By the year 2020, 75% of the population of our state will be in such towns and sometime prior to the year 1980, over one-half of Nebraska will be living in the Omaha-Lincoln metropolitan areas. Realistically, I don't need to tell you what this population trend will mean as to the relative strength of rural and urban areas in enacting water resource legislation. If doggedly, the rural sector plans to oppose through their mere numbers water legislation and water programs of benefit to urban areas, then they are going to be met with a monumental defeat. Now the point I am attempting to make, and I feel it is a most important point, is that rural water using groups must face up to the fact that the M and I water requirements are quite insignificant in the total water use picture in Nebraska and that rural people, as a matter of need or a matter of right, must cooperate with the urban citizens in meeting the water requirements of the urban as well as the rural areas of our state. Past prejudices and philosophies based on assumptions and ill-begotten facts, must be "laid to rest." In addition we must be willing to modify our water projects to include functions of recreation, fish and wildlife, water quality and water supply which is of real interest to urban dwellers.²³⁰

G. THE MOVEMENT TOWARD MANAGEMENT OF GROUNDWATER IN NEBRASKA

In conflicts between private users competing for a groundwater supply, the traditional common law approach presents a number of drawbacks. First, the outcome of litigation is so uncertain, the

229. *E.g.*, PROCEEDINGS at 35 (1971); PROCEEDINGS at 58-59 (1970); PROCEEDINGS at 77 (1969); PROCEEDINGS at 78 (1968); PROCEEDINGS at 85-86 (1967); PROCEEDINGS at 70-71 (1966); PROCEEDINGS at 80-81 (1965).

230. PROCEEDINGS at 50 (1969).

proceedings are so burdensome, and the expense of obtaining the necessary hydrologic evidence is so expensive that the parties usually choose to work out a practical adjustment between themselves.²³¹ Second, when the parties do litigate, neither the reasonable use nor the correlative rights rule has proven effective in time of a significant water shortage.²³² Third, litigation does not begin until the competing uses are operating against each other. Fourth, the court is unaware of the entire situation within an area since conflicts are brought to it on a piecemeal basis within a framework of issues shaped narrowly by the parties in their own self-interest. The court considers only the rights of the immediate participants; public concerns are not brought to light within this frame of reference. Thus:

[S]o long as it is administered solely through the courts, it will be difficult, if not impossible, to arrive at a scientifically sound water policy. This is in no way a criticism of the courts, but is a recognition of the fact that they were developed to settle disputed issues, not to plan and execute programs involving large doses of public policy.²³³

It is generally recognized that neither local management nor a workable long-term state water plan can be evolved by the process of private litigation which offers only a narrow perspective of problems throughout an area. Courts have neither the staff nor the expertise to formulate a scientifically sound water plan, and they have relatively few methods of initiating procedures to assure effective development or management. Courts can only react to the cases before them. In short, the matter has passed beyond the competence of courts,²³⁴ and future guidance must come from legislative leadership.

231. See Danielson, *Water Administration in Colorado—Higher Priority or Priority*, 30 ROCKY MT. L. REV. 293 (1958).

232. See M. McDUGAL & D. HABER, *PROPERTY, WEALTH, LAND* 993-94 (1948).

233. J. CRIBBETT, *ILLINOIS WATER RIGHTS LAW* 27 (1957). See also Trelease, *A Model State Water Code for River Basin Development*, 22 LAW & CONTEMP. PROB. 301, 317 (1957).

234. TRELEASE-WIS. at 80; Ackerman & Sawyer, *The Uncertain Search for Environmental Policy: Scientific Factfinding and Rational Decisionmaking Along the Delaware River*, 120 U. PA. L. REV. 419, 427-28, 496 (1972). See TRELEASE-WIS. at 306-07; Harnsberger at 752-53; *A State Statute to Provide Controls for Equitable Distribution of Water*, 4 HARV. J. LEGIS. 399, 401 (1967). Professor Sax, however, says judges lack expertise and, therefore bring fewer preconceptions to the adjudicative process than administrators. In addition, "judges do not ordinarily receive telephone calls from Senators . . . and they do not have an agency's program or budget to balance against the merits of a particular case." J. SAX, *DEFENDING THE ENVIRONMENT: A STRATEGY FOR CITIZEN ACTION* 108 (1971).

The Nebraska statutes pertaining to groundwater have been enacted on a piecemeal basis.²³⁵ In 1957, the legislature:

(1) Prohibited location of one irrigation well within 600 feet of another irrigation well²³⁶ and provided that irrigation wells must be registered within fifteen days of completion with the Department of Water Resources;²³⁷

(2) Specified a preference scale under which domestic use is favored over agricultural use and agricultural use is preferred over manufacturing and industrial uses;²³⁸ and

(3) Required that well logs be filed with the Director of Water Resources and the Conservation and Survey Division of the University of Nebraska.²³⁹

In 1959, provision was made for organization of voluntary Groundwater Conservation Districts with power to "institute corrective measures to ensure the proper conservation of groundwater within the district."²⁴⁰ Two years later, plugging or capping of abandoned irrigation wells was ordered.²⁴¹ Finally, in 1963, the legislature:

(1) Defined groundwater as that which "occurs or moves, seeps, filters, or percolates through the ground under the surface of the land";²⁴²

(2) Prohibited pumping from pits located within fifty feet of a stream bank for irrigation purposes without a permit;²⁴³

(3) Defined "domestic use" for purposes of the preference statute as all uses "required for human needs as it relates to health, fire control, and sanitation and shall include the use of groundwa-

235. For a fuller discussion of these laws, see Harnsberger at 732-42, 749, 754-55.

236. Neb. Laws c. 201, §§ 2, 3, 4 (1957), now NEB. REV. STAT. §§ 46-609 to -611. (Reissue 1968).

237. Neb. Laws c. 200, § 2 (1957), now NEB. REV. STAT. § 46-602 (Reissue 1968). Registration is solely for information; rights are not acquired by registration and priorities between users are not established.

238. Neb. Laws c. 598, § 1 (1957), now NEB. REV. STAT. § 46-613 (Reissue 1968).

239. Neb. Laws c. 200, §§ 2, 3, 4 (1957), now NEB. REV. STAT. §§ 46-602 to -604 (Reissue 1968).

240. Neb. Laws c. 221 (1959), now NEB. REV. STAT. § 46-614 to -634 (Reissue 1968).

241. Neb. Laws c. 230, § 1 (1961), now NEB. REV. STAT. § 46-602(3) (Reissue 1968).

242. Neb. Laws c. 274, § 1 (1963), now NEB. REV. STAT. § 46-635 (Reissue 1968).

243. Neb. Laws c. 275, §§ 1, 2 (1963), now NEB. REV. STAT. §§ 46-636 to -637 (Reissue 1968).

ter for domestic livestock as related to normal farm and ranch operations";²⁴⁴ and

(4) Enacted the City, Village and Municipal Corporation Groundwater Permit Act.²⁴⁵

These statutes, singly or in combination, are ineffective to allocate a supply of water in time of shortage. Spacing statutes prevent direct interference between wells; laws prohibiting waste promote conservation; registration and well logs supply helpful information. None of the statutes, however, solve problems in localities where water levels have been or are declining excessively; none solve the conflicts between well users, or the conflicts between surface appropriators and well owners. Further, even though Groundwater Conservation Districts encourage educational efforts towards collective corrective action, none have attempted to manage supplies.²⁴⁶

This statutory framework is not adequate to provide focus, continuity, innovation, and security of rights. Before an attempt is made to change the legal rules, however, the exact nature of the specific problem and attitudes concerning it should be isolated.²⁴⁷ With that principle in mind, we submit the following criticisms of existing Nebraska groundwater laws.

1. *Non-Using Owners*

The present system will lead eventually to ruinous over-development of the groundwater supplies. After early irrigators in an area have made substantial investments, their increased yields and success become known to others who have played "dog-in-the-manger." The rights of these previously non-using landowners are never lost through non-use, so they can start pumping whenever they choose even though the investments of earlier developers are threatened. The point has been made numerous times. In 1957, for instance, Mr. Paul Good, then a prominent Omaha attorney and former Attorney General of Nebraska said:

244. Neb. Laws c. 279, § 1 (1963), now NEB. REV. STAT. § 46-613 (Reissue 1968).

245. Neb. Laws c. 276 (1963), now NEB. REV. STAT. §§ 46-638 to -650 (Reissue 1968).

246. For a discussion of local districts, see Clark, *Groundwater Management: Law and Local Response*, 6 ARIZ. L. REV. 178, 206-07 (1965); Harnsberger at 754-58.

247. Beutel, *The Relationship of Experimental Jurisprudence to Other Schools of Jurisprudence and to Scientific Method*, 1971 WASH. U. LAW Q. 385, 386.

[A] man can sit on his water rights and never use them, let his neighbors develop their water and spend thousands of dollars for wells and leveling, then come along and take the water away from them so as to jeopardize and, perhaps, seriously impair the investment that they have.²⁴⁸

2. *Overdevelopment*

All users, including the new ones, tend to overestimate the total water supply, and once they discover the true situation there is no incentive for any individual to reduce his use.²⁴⁹ The philosophy soon develops that by pumping less one is only leaving more for others. Discussing the inclination toward short-term profits, Professor Loyd Fischer has written:

[I]n the face of an impending shortage of water, individuals may be induced to initiate water-using activities for the purpose of establishing a history of water use. Property rights in groundwater are uncertain, but most users believe that if, at a later date, water is rationed, the bases for apportionment will include past beneficial use. At such a time, those who have a history of use will likely have established a right with a capitalized value which may be either exercised or sold. Those without a history of use are likely to end up with lesser rights or none at all.

Furthermore, a declining water table, with consequent diminishing well yields, tends to result in accelerated water development activities in the form of additional wells to maintain sufficient flows to operate systems already installed.

Finally, individual users, communities, areas and states rapidly exploit readily available water supplies on the assumption that the federal government will, when the supplies are exhausted, develop new sources, irrespective of the costs of such development, to supplement or supplant the dwindling stocks.²⁵⁰

Thus, each groundwater user considers only his immediate pumping costs and not the long-term costs accompanying declining water tables.²⁵¹

248. PROCEEDINGS OF THE NEBRASKA WATER CONFERENCE 133 (1957). The threat of non-using landowners beginning use also could keep total investment below optimum levels but this is unlikely.

249. See Schelling, *On the Ecology of Micromotives*, in *THE PUBLIC INTEREST* 61 (No. 25, 1971).

250. L. Fischer, *Management of Groundwater* 4-5 (paper presented to the annual meeting of the Nebraska section of the American Water Resource Ass'n, Omaha, Oct. 20, 1971).

251. Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243, 1244-45 (1968):

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd." This utility has one negative and one positive component.

(1) The positive component is a function of the increment

3. *Future Generations*

Present planning does not consider the effect of uncontrolled groundwater withdrawals on future generations. If, however, planners set goals covering at least fifty to seventy-five years, greater weight would be given to conserving resources for later needs. Use of models with fairly long time horizons tends to lengthen everyone's view; nevertheless, "A weakness of all the water rights doctrines applied to a stock [fixed quantity of supply], if more than one right exists, is that present uses are favored over future uses."²⁵²

4. *A Water Market*

Water utilization is too rigidly controlled by laws and administrative structures and as a result water cannot be transferred easily from use to use or from place to place. In Nebraska, water policy has focused almost entirely on the Department of Water Resources, and water laws and institutions such as irrigation districts. Not only has little attention been given to providing more opportunities for acquiring rights through a market, but political constraints have been imposed to prevent voluntary transfers between willing buyers and willing sellers. These restraints include making water permanently appurtenant to the land where it is applied, setting preferences favoring some uses and users over others, and prohibiting transbasin diversions.

of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

(2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsman, the negative utility for any particular decisionmaking herdsman is only a fraction of -1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a common brings ruin to all.

252. Bagley, *Water Rights Law and Public Policies Relating to Groundwater "Mining" in the Southwestern States*, 4 J. LAW & ECON. 144, 153 (1961). See also Bagley, *Some Economic Considerations in Water Use Policy*, 5 U. KAN. L. REV. 499, 504 (1957); Trelease, *Policies for Water Law: Property Rights, Economic Forces, and Public Regulation*, 5 NAT. RES. J. 1, 40-41 (1965).

Similar restrictions are imposed upon groundwater transfers. A market in groundwater presents problems not encountered when dealing with surface watercourses. These problems are not, however, insurmountable. As a general *modus operandi* groundwater conveyances should be allowed without restraint if no injury occurs to third persons and aesthetic and recreational values are not seriously affected.²⁵³ A limited decision making machinery would be necessary to make these determinations,²⁵⁴ but the market mechanism would be more efficient than an administrative agency in moving water to higher value uses and would be less expensive. Professor Jerome W. Milliman has written:

It is evident that current water laws do not treat water rights as property capable of the economic treatment accorded to other types of property, such as land or mineral rights. To the extent that water rights are allowed to become real and personal property and to the extent that they are transferable, it would be possible to rely on the market and individual decision-making to allocate water resources to "their highest use." The arguments for treating water rights in this fashion are the same as those justifying the market process and individual decision-making in the use of all of our resources, i.e., when they provide for maximum production and efficiency consistent with individual freedom of choice. . . . For those who wish to emphasize private decision-making, the only restrictions which should be placed upon individual decision-making in the use of water resources are the same ones which govern the use of all other property.²⁵⁵

Although a number of persons have urged moving towards a market system dealing with water transfer,²⁵⁶ it is unlikely that

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253. See Trelease, *Changes and Transfers of Water Rights*, 13 ROCKY MT. MINERAL L. INST. 507, 510, 518-21 (1967); Ellis, *Water Transfer Problems*, in WATER RESEARCH 238, 242-48 (A. Kneese & S. Smith eds. 1966).
254. Yeutter at 19-21.
255. Milliman, *Water Law and Private Decision-Making: A Critique*, 2 J. LAW & ECON. 41, 45-46 (1959). See also Milliman, *Economic Considerations in Allocating Water Resources*, in PUBLIC POLICIES RELATING TO WATER 86 (U. of Mo. Extension Service MP 2/966).
256. E.g., REPORT BY THE COMMITTEE ON WATER OF THE NATIONAL RESEARCH COUNCIL, ALTERNATIVES IN WATER MANAGMENT 37 (Pub. 1689, Nat'l Academy of Sciences, 1966); J. HIRSHLEIFER, J. DEHAVEN & J. MILLIMAN, WATER SUPPLY: ECONOMICS, TECHNOLOGY AND POLICY 40 (1960); C. MEYERS & R. POSNER, MARKET TRANSFERS OF WATER RIGHTS: TOWARD AN IMPROVED MARKET IN WATER RESOURCES iv (Nat'l Water Comm'n Rep. NWC-L-71-009, July 1, 1971); Trelease, *Policies for Water Law: Property Rights, Economic Forces, and Public Regulation*, 5 NAT. RES. J. 1 (1965); Trelease & Lee, *Priority and Progress—Case Studies in the Transfer of Water Rights*, 1 LAND & WATER L. REV. 1 (1966); TRELEASE-WIS. at 56-62, 67-76; Yeutter at 60; C. YEUTTER, WATER ADMINISTRATION—A SUGGESTED INSTITUTIONAL MODEL 7, 14, 19-21 (U. Neb. Dep't Ag. Econ. Rep. 46, Dec. 1968); L. Fischer,

private arrangements for conveying rights will be permitted in Nebraska within the near future. Nevertheless, in a society which has historically made a strong commitment to the market system,²⁵⁷ the matter is deserving of more serious consideration than it has received to date, either locally or nationally.²⁵⁸

5. *The Public Interest*

A system of conjunctive use and management of all the state's water resources will be impossible so long as groundwater diversions are unrestricted. There is a firm attitude among farm irrigators in Nebraska that groundwater is private property and must therefore remain perpetually free of all management controls. Many irrigators, however, are beginning to realize that the heavy reliance which municipalities and industries place on groundwater has given all people a legitimate interest in its orderly development and allocation.

6. *Integration of Streams and Groundwater Supplies*

No definite method exists for settling disputes between appropriators on streams whose rights often date back to the 1880's and well owners whose withdrawals are much later in time. Instances of conflict are becoming more discernible,²⁵⁹ although problems have been evident for some time. As early as 1940, the Nebraska Supreme Court observed that the water table necessary to support a continuous flow in the Platte River "has been affected

Water Issues To Be Faced in the Great Plains 11 (unpublished paper on file with the authors). See also Johnson, *An Optimal State Water Law: Fixed Water Rights and Flexible Market Prices*, 57 VA. L. REV. 345 (1971); J. KRUTILLA & O. ECKSTEIN, *MULTIPLE PURPOSE RIVER DEVELOPMENT* 52 (Johns Hopkins paperback ed. 1958); CORKER at 132-42. For some reasons why a market may fail, see Castle & Stoevener, *Water Resources Allocation, Extramarket Values, and Market Criteria: A Suggested Approach*, 10 NAT. RES. J. 532, 535 (1970).

257. See generally W. HURST, *LAW AND ECONOMIC GROWTH: THE LEGAL HISTORY OF THE LUMBER INDUSTRY IN WISCONSIN* 285 (1964), *LAW AND SOCIAL PROCESS IN UNITED STATES HISTORY* 5-6 (1960), *LAW AND THE CONDITIONS OF FREEDOM IN THE NINETEENTH-CENTURY UNITED STATES* 11-14, 44 (1956).

258. Timmons, *Water Allocation: Supply and Demand Relationships, in OPPORTUNITIES FOR REGIONAL RESEARCH ON WATER RESOURCES PROBLEMS* 50 (U. of Iowa Ag. Law Center Monograph No. 10, Sept. 1968). All authors do not agree with a market approach.

259. See statement by A. Hoyt, President, Pathfinder Irrigation Dist., *PROCEEDINGS* at 11 (1964); E. C. Reed, former Director, Conservation and Survey Div., U. of Neb., *id.* at 22-23. *FRAMEWORK STUDY* at 32.

materially by pump irrigation."²⁶⁰ If surface flows are depressed for a long period it becomes impossible to fulfill the legal obligations which assure downriver states quantified amounts of water.²⁶¹ Further complications affecting all residents of a state result when levels get too low for recreation, transportation, waste elimination, power generation, amortization of surface facility costs, and continued vitality of river eco-systems.²⁶² Moreover, if groundwater alone is used for irrigating, the salinity of the soil builds up rapidly; other water is therefore needed to "flush" the ground.²⁶³ Consequently, it is undesirable to prefer groundwater irrigators over stream users in all situations.

By 1960, pumping from wells located near small streams had lowered surface levels to such an extent that stream appropriators in Nebraska were installing their own wells to protect their supplies by changing points of diversion.²⁶⁴ Four years later, the Director of Water Resources observed that whenever his office closed the headgates of junior appropriators on a stream, the number of new irrigation wells increased sharply.²⁶⁵ This is commonplace in the West²⁶⁶ where junior appropriators turn to wells during dry seasons. Also, once streams are fully appropriated, those who are unable to obtain any rights turn to well installation. The usual effect of such activities over time is to reduce surface flows because almost all groundwater is tributary to some stream, *i.e.*, hydrologically connected, and the source of the surface flow.²⁶⁷

260. State *ex rel.* Cary v. Cochran, 138 Neb. 163, 171, 292 N.W. 239, 245 (1940).

261. See Jones, *Nebraska's Water Compacts*, in PROCEEDINGS OF NEBRASKA WATER RESOURCES AND IRRIGATION DEVELOPMENT SEMINAR FOR THE 1970'S H-1, H-6 to H-8 (U. of Neb., Lincoln, March 2-3, 1972).

262. Harrison & Sandstrom, *The Groundwater-Surface Water Conflict and Recent Colorado Water Legislation*, 43 U. COLO. L. REV. 1, 18 (1971).

263. *Id.* Frequently the reverse situation is found in Nebraska, especially on the South Platte River where surface water contains a high concentration of dissolved solids. The low quality results largely from low flows and high use and reuse upstream by irrigation districts and municipalities. Groundwater irrigation adds lime and thus helps offset the effect of the surface water use.

264. Statement by Glen Beerline, PROCEEDINGS 126 (1960). The Templeton doctrine allows a stream appropriator to drill wells in the aquifer feeding the stream to protect his rights when later wells in the basin decrease surface flow. Templeton v. Pecos Valley Artesian Conservation Dist., 65 N.M. 59, 332 P.2d 465 (1958), discussed in Ellis at 474-75.

265. Lincoln Star, Aug. 5, 1964, at 3, col. 3, Omaha World-Herald, Aug. 5, 1964, at 6, col. 7; Omaha World-Herald, Aug. 12, 1964, at 7, col. 5.

266. Ellis at 472.

267. E. JOHNSON, GROUNDWATER AND WELLS 55 (1st ed. 1966). Pumping either takes water which would reach and increase stream volume or water which is percolating from the stream to the aquifer. In either

Wells near surface irrigation canals and laterals, as distinguished from natural waterways, also create problems because they intercept water which otherwise would reach these artificial waterways and later become return flow to streams. Loss of return flow harms downstream surface water appropriators. This problem prompted the president of the Nebraska Irrigation Association to ask at the 1964 convention what the outcome would be if irrigation wells became so numerous in a valley that they intercepted the return flow of a river which downstream users had depended upon for many years.²⁶⁸

If the doctrine of prior appropriation²⁶⁹ and the modified version of reasonable use²⁷⁰ were carried to their logical conclusion, all Nebraska wells would be shut down and all Nebraska streams would dry up. Thus, when a showdown comes between groundwater and surface water users over adoption of a rule favoring one over the other, an accommodation must be made. Otherwise, huge investments will be jeopardized and new enterprises will be curtailed. Although the solution is obscure, the following data shows that the enormity of the problem is not. There are more than 35,000 irrigation wells in Nebraska and 1,000 are being added each year. By 1963, individual farmers had invested over 175 million dollars in irrigation wells and equipment and the amount is much greater today. Costs are rising constantly. A center pivot sprinkler irrigation system, increasingly popular in sandy soils, requires an initial investment of between 25,000 and 35,000 dollars per 160 acres. In connection with surface waters, the state and federal governments have spent over 285 million dollars on irrigation structures.²⁷¹

The reason for Nebraska's bifurcated approach to surface and groundwater uses is mainly historical. Most of the early inhabi-

case, stream flow is depleted. Not all water pumped comes from or depletes the source of the stream; some is true groundwater which surface appropriators would not have had at their disposal. Harrison & Sandstrom, *The Groundwater—Surface Water Conflict and Recent Colorado Water Legislation*, 43 U. COLO. L. REV. 1, 14 (1971).

268. Jack Boyd, President's Address, in PROCEEDINGS at 9 (1965).

269. Riparian rights are also recognized in restricted cases. For a recent discussion of this dualistic control of surface water diversions, see Comment, *The Dual-System of Water Rights in Nebraska*, 48 NEB. L. REV. 488 (1969).

270. Groundwater is defined by statute as "that water which occurs or moves, seeps, filters or percolates through the ground under the surface of the land." NEB. REV. STAT. § 46-635 (Reissue 1968). Inferentially, all other water is either diffused surface water or water subject to the rules controlling lakes and streams.

271. PROCEEDINGS at 64 (1963).

tants settled by streams, and when large diversions for irrigation began in the nineteenth century the western practice of applying the prior appropriation system was followed. Little land was irrigated from wells, and the hydrological interaction between surface and groundwater was not perceived. Subterranean water was considered so secret and unknowable that legal rules could not be formulated to regulate its use.²⁷² Thus, a separate system of institutional control evolved.

Devising a system to attain integrated utilization of ground and surface waters is one of the most perplexing problems in water law.²⁷³ Many approaches have been tested. Colorado, for example, distinguishes between tributary and non-tributary groundwaters. The former eventually would reach and become part of a watercourse if unimpeded by man;²⁷⁴ the latter supposedly would not.²⁷⁵ Although there is still limited discussion among hydrologists regarding the matter, most agree there is no physical basis for the distinction,²⁷⁶ and the legislative enactments, litigation and confusion in Colorado are legion.²⁷⁷

Another classification having little hydrologic foundation is the distinction made by court decree, or by statute in some jurisdictions, between groundwater and underground streams. Although the physical criteria differ from state to state, usually if a court decides there is a definite channel with water moving through it at a minimum rate, it treats the source as an underground stream and applies the laws governing surface streams.²⁷⁸

272. 5 CLARK at 410, 473.

273. H. THOMAS, *THE CONSERVATION OF GROUNDWATER* 136-38, 250 (1951); Tolman and Stipp, *Analysis of Legal Concepts of Subflow and Percolating Waters*, 21 ORE. L. REV. 113 (1942); Trelease, *A Model State Water Code for River Basin Development*, 22 LAW & CONTEMP. PROB. 301, 310-12 (1957); Weil, *Need of Unified Law for Surface and Underground Water*, 2 S. CAL. L. REV. 358 (1929).

274. COLO. REV. STAT. ANN. § 148-21-2 to -21-3 (Supp. 1969).

275. COLO. REV. STAT. ANN. § 148-18-2 (Supp. 1971). For a good discussion of the often used legal distinction between tributary and non-tributary groundwater, see Widman at 531-32.

276. E. MOULDER, *LEGAL AND MANAGEMENT PROBLEMS RELATED TO THE DEVELOPMENT OF AN ARTESIAN GROUNDWATER RESERVOIR 4* (U.S. Geol. Survey Colo. Groundwater Cir. No. 6, 1962); Moses, *Basic Groundwater Problems*, 14 ROCKY MT. MINERAL L. INST. 501, 518 (1968); Widman at 527-29.

277. See Harrison & Sandstrom, *The Groundwater—Surface Water Conflict and Recent Colorado Water Legislation*, 43 U. COLO. L. REV. 1 (1971); White, *Survey of Colorado Water Law*, 47 DENVER L.J. 179 (1970); *Appropriation and Colorado's Groundwater: A Continuing Dilemma?*, 40 U. COLO. L. REV. 133 (1967).

278. 5 CLARK at 443-44. All groundwater is presumed to be percolating

The effect of such distinctions as tributary and non-tributary, and percolating water and underground stream, has generally been negative because the classifications have been used as absolute criteria rather than tools for an ultimate decision. No middle ground exists between the opposing ends of the distinctions, hence problems which do not fit the mold of a classification must be straight-jacketed and treated as something they are not. Although courts have used these distinctions to arrive at equitable and practical solutions, the ultimate consequence is a maze of inconsistent legal precedents providing no practical guidelines for individuals, agencies and courts deciding later cases. These spurious classifications should not be perpetuated.²⁷⁹

A public administrative management plan would aid in solving problems between well owners and stream irrigators, but even if such a system is not adopted there are approaches the legislature could take to express the viewpoint of the people and provide guidelines for the courts. Some of the possibilities retain flexibility; others are rigid. One of the most inflexible is the Texas scheme which grants a completely arbitrary preference to groundwater users. Under Texas law, all aspects of the hydrological cycle are ignored and the absolute ownership rule of groundwater is applied to the point where surface appropriators have no rights to water until it actually enters the stream.²⁸⁰

A rule that well owners can destroy prior vested rights in the stream without liability seems unduly harsh, but there may be economic justification. By putting surface appropriators at a disadvantage, particularly in dry years, fiscal pressure encourages use of groundwater which is generally more costly. The theory is that this promotes utilization of all sources and discourages wasteful practices.

Most western states take a different approach by placing all groundwater under an appropriation-permit system.²⁸¹ Kansas, for example, recognized vested rights to existing uses of groundwater

and the burden of proving an underground stream is on the claimant. *Id.* at 443 n.97.

279. CORKER at 155. THE RESTATEMENT (SECOND) OF TORTS 156, 160-62 (Tent. Draft No. 17, 1971), does maintain, however, the distinction between percolating waters and underground streams.

280. *Water Control and Improvement Dist. v. Williams*, 271 S.W.2d 503 (Tex. Civ. App. 1954).

281. Clark, *Groundwater Management: Law and Local Response*, 6 ARIZ. L. REV. 178, 181-82 (1965); Clyde, *Mineral Rights versus Water Rights*, 2 NAT. RES. L. 299, 312 (1969). The statutory citations are collected in 5 CLARK at 441 n.27.

in 1945,²⁸² and with the exception of Texas²⁸³ and Nebraska, all western jurisdictions require some type of administrative approval to withdraw subterranean water. Even in the humid East, permit systems are not uncommon. In 1957, Iowa enacted a water rights law which is administered by a State Water Commission. Both surface and groundwaters are regulated and a permit which cannot exceed ten years in duration must be secured before a withdrawal, subject to broad exemptions, may be made.²⁸⁴ In Minnesota, Maryland, Florida, New Jersey, Indiana, New York and Wisconsin some procedure exists either for regulating groundwater withdrawals or for dealing with special situations.²⁸⁵ The approach in the East usually has been to regulate diversions by authorizing a state administrative agency to grant or deny water use permits or licenses which terminate after a specific period of time.

In the event of critical drought conditions, the Nebraska Legislature would unquestionably give serious consideration to an appropriation-permit system, to a scheme of different regulatory rules for wells in close proximity to rivers, or to a codification of guidelines such as those promulgated by the American Law Institute in the *Restatement of the Law of Torts*. The cut-off line approach has been used by the legislature in connection with flood plain zoning regulations and in the past the Nebraska Supreme Court frequently has given weight to views expressed in the *Restatements*.²⁸⁶

a. Cut-Off Points

Under a cut-off system, a boundary line determines where a particular water doctrine is applied. All water between the bank

282. See KAN. STAT. ANN. § 82a-703 to -704 (1969); 5 CLARK at 466-67.

283. Texas encourages management by large scale groundwater districts more than most jurisdictions. See Greenhill & Gee, *Ownership of Groundwater in Texas; the East Case Reconsidered*, 33 TEXAS L. REV. 620, 629 (1955). Information on a district operation covering parts of fifteen counties and five million acres is found in *The Cross Section*, a monthly publication of the High Plains Underground Water Conservation Dist. No. 1 which has its district office in Lubbock, Tex.

284. See HINES for a comprehensive study and evaluation of the Iowa experience in integrating regulation of surface and groundwaters. See also O'Connell, *Iowa's New Water Statute—The Constitutionality of Regulating Existing Uses of Water*, 47 IOWA L. REV. 549 (1962).

285. See MEYERS & TARLOCK at 581-84; Harnsberger at 747-48; M. HEATH, JR., CONTEMPORARY EASTERN WATER RIGHTS REGULATION 24 (U. N.C. Water Resource Paper No. 17, May 1966); Ellis, *Some Current and Proposed Water-Rights Legislation in the Eastern States*, 41 IOWA L. REV. 237 (1956).

286. *Wasserburger v. Coffee*, 180 Neb. 149, 141 N.W.2d 738 (1966).

of a natural stream and the cut-off point could be subject to prior appropriation; beyond the line the reasonable use rule would govern. To a limited extent the legislature has already experimented with statutory pumping boundaries. In 1962, the Nebraska Legislative Council Committee on Water Control recommended that a permit from the Department of Water Resources be required to pump from any pit or well within 200 feet of a natural stream. The legislature, choosing not to follow the recommendation, refused to prohibit diversions from wells but did forbid withdrawals from pits located within fifty feet of a bank unless special permission was obtained.²⁸⁷ A 1963 proposal by the Metropolitan Utilities District of Omaha would have made all groundwater within one-half mile of any river subject to prior appropriation. This suggestion, although rejected, was the opening shot which led to passage of the City, Village and Municipal Corporation Groundwater Permit Act that year.²⁸⁸

A principal question in connection with using cut-off lines for applying prior appropriation and reasonable use rules is whether a statutory limit is conclusive or merely creates a rebuttable presumption. If the boundaries are conclusive, wells will be prohibited inside the lines. A law creating presumptions appears more flexible although the result probably will be the same in most cases. A presumptive law, for instance, could specify that wells within 200 feet of a stream are presumed to adversely affect the surface flow and the burden of proving to the contrary is on the well owners; wells located more than 1,000 feet from a river bank are presumed to have no effect on surface flows and the burden of proving otherwise falls on the one diverting from the watercourse. In cases where wells are located more than 200 feet but less than 1,000 feet from a river bank, no presumption exists either way and the burden is on the one who commenced the court proceedings. Because of the expenses involved and the problems of substantiating proximate cause, such a law might protect most wells located farther than 1,000 feet away.

b. *The Restatement Position*

The most flexible approach is that taken in the tentative draft of the *Restatement (Second) of the Law of Torts*. According to the *Restatement*, when litigation occurs between a stream user and a well owner, the latter should win unless his withdrawal "has a

287. NEB. REV. STAT. § 46-636 to -637 (Reissue 1968). For the background to this legislation, see Harnsberger at 741 (1963).

288. NEB. REV. STAT. §§ 46-638 to -650 (Reissue 1968).

direct and substantial effect" on the stream.²⁸⁹ Once a stream owner proves a substantial and direct interference the court would consider the following factors in resolving the conflict: the purpose, suitability, and economic and social value of the use, the extent and amount of the harm, the practicality of avoiding the harm by adjusting the use or method of use of one proprietor or the other, the practicality of adjusting the quantity of water used by each proprietor, the protection of existing values of land, investments and enterprises, and the burden of requiring the user causing the harm to bear the loss.²⁹⁰

In one of the *Restatement* illustrations, a city drills filtration wells near the bank of a small river flowing through a narrow valley. After large withdrawals, the groundwater ceases to feed and support the river and it begins to lose water from seepage. The city is liable to a downstream surface user who suffers "unreasonable harm."²⁹¹ In a second illustration, a number of farmers in a wide valley are pumping irrigation water at various distances from a river. While the effect of each farm well is minuscule, the combined well withdrawals eventually reduce stream flow. The farmers are not liable for the harm suffered by downstream surface users.²⁹² The pivotal question according to the tentative draft is whether the groundwater pumping has "a more or less immediate and substantial effect upon the stream of flowing water."²⁹³ "Immediate" appears to be the key because in nearly every situation the aggregate pumping throughout a large area will have a material and adverse consequence on stream flows if given enough time. By emphasizing immediacy of effect the tentative draft recognizes that the groundwater sector does not respond rapidly enough to make injunctions against pump irrigators effective during times of shortage.

An opposing view is that because practically all subterranean withdrawals eventually intercept water on its way to a stream, stream users should not lose their prior rights even though the effect of pumping groundwater is not immediately visible. Well owners cannot extend pipes into the watercourse or dig channels in the bank without a permit. Nevertheless, their vertical diversions produce the same result and permit doing indirectly what cannot be done directly. The thesis is well stated in an early Kansas decision:

289. RESTATEMENT (SECOND) OF TORTS § 858A(c) (Tent. Draft No. 17, 1971).

290. *Id.* § 850B.

291. *Id.* § 858A, illustration 5 at 161.

292. *Id.* § 858A, illustration 6 at 161.

293. *Id.* § 858A, comment e on clause (c) at 161.

[I]f a well on the very bank would be restrained, may the same result be accomplished by digging one a few feet off? It would seem as though but one answer could in justice be given—that the owner of an established power is entitled to protection against any subtraction therefrom, whether sought to be accomplished by direct or indirect methods. We are aware that the further the well is removed from the bank of the stream, the more difficult and uncertain the evidence of the abstraction of the water; but when the fact of abstraction is proved, it would mean that relief must necessarily follow.²⁹⁴

To the degree that this statement means that all diversions of groundwater on the way to a stream should be enjoined regardless of when the water will arrive at the river bank, we do not agree. When a stream appropriator or riparian owner seeks to protect his prior rights, a court should balance his gains against the losses junior well owners will suffer. The court must also realize that shutting down groundwater pumpers during dry periods will accomplish little. Only a small proportion of the groundwater will reach the stream soon enough to be of any benefit and much of it will simply be left in the reservoir to establish effluent flow conditions.²⁹⁵ This is a misallocation because water stored beneath the surface should be heavily used in times of shortage and built back up when there is above average precipitation.

H. LOCAL CONTROL

Nebraska has reached the stage in groundwater development where a severe drought will result in a crisis situation accompanied by demands for control mechanisms. If changes are made under pressure, they will continue to be either piecemeal or favorable to those who band together because their interests happen to be critical at the time. When reaction comes during a crisis or comes too long after problems have become acute the costs of corrective measures are almost always higher. For this reason, formulation of a broad philosophy of goals and implementation is needed now.

Almost all wells in the state have been developed by local initiative and are privately owned; thus, at this time, the management of groundwater is controlled largely by thousands of farmers making individual decisions. The hard questions are to what extent this control should be in the larger community, and what types of centralization will have a reasonable chance of receiving public acceptance. This will, of course, depend on what constraints are

294. *City of Emporia v. Soden*, 25 Kan. 588, 609 (1881).

295. For an analysis, see E. MOULDER, *A PLAN FOR THE PRACTICAL MANAGEMENT OF THE WATER RESOURCES IN AN ALLUVIAL VALLEY* (U.S. Geol. Survey Open-File Rep., Colo. Dist. 1960).

placed on groundwater, by whom, when and where. We recommend that the state's groundwater be managed in the first instance at the local level,²⁹⁶ with the recognition that centralization of some matters at the state level is imperative.

1. *Special Purpose Districts in Nebraska*

If groundwater is to be managed at the local level, there are a number of organizations which could handle the administration. Where an irrigation district or public power and irrigation district is supplying water to farm operators, it should be permitted to regulate groundwater when it can prove to a state administrative agency that such regulation is necessary to administer an effective conjunctive use plan. Where these districts choose not to manage groundwater, the job can be done through one of the twenty-four newly created Natural Resources Districts, commonly called NRDs.²⁹⁷ The concept of these districts is innovative and could serve as a model for other states seeking to consolidate proliferating local government districts. It is therefore worthwhile to discuss the background leading to their establishment.

By the 1860's it had become apparent that projects could not be instituted without authorization for irrigators to form associations.²⁹⁸ An 1877 statute authorized formation of corporations to develop irrigation or water power; this statute was extended in 1889. In 1895 a comprehensive water code was adopted and irrigation districts were sanctioned. Thereafter, as other soil and water conservation problems arose, the legislature reacted by permitting formation of new organizations with special powers. For instance, in 1881, 1905, 1907, and 1911 laws were passed to establish drainage districts. The 1930's brought severe erosion and the resultant organization of soil and water conservation districts. Floods in the 50's led to watershed district legislation in 1953 and 1957. Rapid

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296. On March 2, 1972, Harvey Banks, former State Engineer and the first Director of Water Resources for California and a consultant to the Neb. Natural Resources Comm'n, stated: "Anathema though it may be, the time will come when there will have to be some type of control over the development and utilization of groundwater. . . . I hope you can evolve a management scheme . . . where management is done on a local area basis." Banquet Address in PROCEEDINGS OF THE NEBRASKA WATER RESOURCES AND IRRIGATION DEVELOPMENT SEMINAR FOR THE 70's, AA-11 (U. of Neb., Lincoln, March 2-3, 1972).
297. See G. Rozmarin, *Ground and Surface Waters in Nebraska* 32 (paper prepared for the Neb. Soil & Water Conservation Comm'n, March 1969).
298. R. FISCHER, D. AXTHELM & R. KENNEDY, *NEBRASKA'S NEW NATURAL RESOURCES DISTRICTS 2* (U. of Neb. Cooperative Extension Service Cir. 70-786, 1970).

irrigation development resulted in the Groundwater Conservation Act of 1959, and the Rural Water District Act was passed in 1967 to aid domestic systems in areas of limited supply.

By 1960, there were about 500 special purpose districts in the state involved in soil and water conservation programs. Each district was created to meet a special need, and as new needs arose, new districts were created. Being under local control they were responsive to grass-roots problems. The leadership, often lacking technical skills and administrative expertise, was highly motivated and genuinely concerned. Because the special districts were easily formed, they became useful for solving particular soil and water problems, and the historical record shows excellent results.²⁹⁹ However, as multi-purpose situations became more commonplace, single purpose districts were less successful in coping with the problems.

When a single purpose approach is taken, districts overlap each other in authority and concern, and duplicated efforts result in loss of time and money. Figures 4 and 5 illustrate the duplication of authority and function that has plagued these districts. There has been no real coordination, horizontally or vertically, to eliminate this waste. As early as 1939, when only 172 districts were in existence, it was noted:

There are no comprehensive and reliable statistics on personnel and finance which cover all units of local government in Nebraska. All of the political subdivisions have legal relationships with one or more departments of the state government, and most of them make reports of one kind or another. These reports, however, are scattered through the records of the State Tax Commissioner, State Auditor, State Superintendent of Public Instruction, Secretary of State, Department of Roads and Irrigation (Department of Water Resources), Department of Agriculture, and State Soil Conservation Committee. Further, many of the things most vital to a study of this nature are not reported to any state agency.³⁰⁰

As the districts proliferated the situation worsened and a subsequent loss of local control occurred. With so many districts competing for attention, well over 100 in one county, voters found it impossible to keep track of a district's actions. As local control lessened, so did participation in local elections. Studies showed as few as ten percent of the potential voters going to the polls.³⁰¹

299. NEBRASKA SOIL AND WATER CONSERVATION COMM'N, MODERNIZATION OF RESOURCE DISTRICT LEGISLATION 3 (State Water Plan Pub. No. 402, March 1969).

300. R. Schumate, 5 Neb. Legis. Council Rep. 55 (1939).

301. THE ADVISORY COMM'N ON INTER-GOVERNMENTAL RELATIONS, THE PROBLEM OF SPECIAL DISTRICTS IN AMERICAN GOVERNMENT 67 (1964).

Other major problems with special districts were lack of administrative expertise and long-range planning³⁰² as well as a fragmented tax base which prevented economies of scale. Almost all districts were geographically too small and without cooperation between the districts there was no chance of solving problems such as those requiring the building and maintenance of structures at places far from the trouble spots.

Finally, at its 1966 and 1967 conventions the Nebraska Association of Soil and Water Conservation Districts called for a study of reorganization. In 1968 the association proposed legislation to reorganize and consolidate soil and water conservation districts, watershed conservancy districts, watershed planning boards, and watershed districts along hydrologic lines whenever possible. The legislation, introduced on April 1, 1969, was referred to the Committee on Agriculture and Recreation, and hearings began a month later. Throughout the hearings, proponents emphasized that the state had moved out of the era of being concerned solely with rural oriented resources problems. Opposition was strong and the legislature did not vote on the bill until after resolutions adopted at the September meeting of the Soil and Water Conservation Districts showed local support. On September 16, the bill, L.B. 1357, was enacted. Twenty-nine voted for; nine against; eleven did not vote.

2. *Summary of L.B. 1357*

As a result of the bill, eighty-six soil and water conservation districts, sixty-two watershed conservation districts, one watershed district, three advisory watershed improvement boards, and two watershed planning boards were consolidated during 1971 into twenty-four Natural Resources Districts covering the entire state. In addition, the law encourages other special purpose districts, including rural water districts, groundwater conservation districts, drainage districts, reclamation districts, and irrigation districts to cooperate with and, where appropriate, to merge with a natural resources district. To prevent formation of districts in the future, after July 1, 1972, no further groundwater conservation districts,³⁰³

302. W. Berberet, *The Evolution of a New Deal Agricultural Program: Soil Conservation Districts and Comprehensive Land and Water Development in Nebraska* 497 (unpublished Ph.D. thesis in Love Library, U. of Neb., Jan. 1970).

303. NEB. REV. STAT. § 46-614.01 (Supp. 1972). The statutes governing Groundwater Conservation Districts require that a majority of the board of directors shall be resident owners of irrigation wells subject to registration. NEB. REV. STAT. § 46-625 (Reissue 1968). This raises

Figure 4

	31-801 to 31-832	2-1550 to 2-1567	31-833 to 31-837	2-1508 to 2-1549	46-1001 to 46-1020	31-101 to 31-451 & 31-901 to 31-933	31-501 to 31-553	31-701 to 31-766	46-101 to 46-1,154	70-601 to 70-672	23-308 to 23-320.13	46-614 to 46-634	46-501 to 46-587	78-2901 to 71-2916
	WATERSHED DISTRICT	WATERSHED CONSERVANCY DISTRICTS	WATERSHED PLANNING BOARD	SOIL and WATER CONSERVATION DISTRICTS	RURAL WATER DISTRICTS	DRAINAGE DISTRICTS	SANITARY DRAINAGE DISTRICTS	SANITARY and IMPROVEMENT DISTRICTS	IRRIGATION DISTRICTS	PUBLIC POWER and IRRIGATION DISTRICTS	COUNTY (CITY) FLOOD CONTROL AUTHORITIES	GROUNDWATER CONSERVATION DISTRICTS	RECLAMATION DISTRICTS	MOSQUITO ABATEMENT DIST.
No. of Districts	1	61	2	86	1	130	1	155	44	5	13	2	5	0
Flood Control	X	X				X	X			X	X			
Erosion Control	X	X		X							X			
Channel Rectification	X					X	X							
Drainage	X	X				X	X	X	X				X	X
Recreation	X	X						X					X	
Water Supply		X			X			X	X	X			X	
Irrigation									X	X			X	

Sewage Disposal		X	X
Pollution Control	X		
Groundwater Regulation			X
Wildlife Preservation	X	X	
Land Use Regulation		X	X
Develop Comprehensive plans for Soil and Water Resources		X	X
Flood Plain Zoning		X	X
Demonstration Project		X	
Hydro-electric Power			X
Mosquito & Fly Control			X

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CHART ILLUSTRATES DUPLICATION OF DUTIES, AUTHORITY

SOURCE OF INFORMATION—NEBRASKA NATURAL RESOURCES COMMISSION

Figure 5

	Formation	How Boundaries Set	Merge & How	Dissolution	Issue Rules & Regulations	Purchase Property	Eminent Domain	Sue & Be Sued	Contract	Levy Taxes (Amount)	Issue Bonds	Borrow Money	Make Special Assessments	Tolls & Charges	Notes & Mortgages	Gifts, Funds, Etc.
Soil & Water Conservation	25 land-owners petition	preset by county lines	51% vote	majority referendum	X	X	X	X	X		X	X	X	X	X	X
Watershed Conservation	60% tax-payers petition	SWCD Subdi-contiguous area	51% vote	majority referendum	X	X	X	X	X	2M	X	X	X	X	X	X
Flood Control Auth. (City/County)	20 free-holders petition	county lines			X	X	X	X	X	1½M	X	X	X	X	X	X
Drainage	variable	variable		variable	X	var.	X	X	X		X	var.	X			
Sanitary Drainage	100 voters petition	by petition	Enlarge Only	vote of ¾ of board	X	X	X	X	X	1M	X	X	X	X	X	X
Sanitary & Improvements	majority vote	by petition	petition & 51% vote	only can be annexed	X	X	X	X	X	1M	X	X	X	X	X	X
Watershed	petition of primary city	drainage area	Enlarge Only	51% vote	X	X	X	X	X	¾M	X	X	X	X	X	X

	by Governor	Governor designates	$\frac{2}{3}$ vote of board							
Watershed Planning Board										X
Irrigation	majority petition	by petition	Board can change boundaries	majority petition	X	X	X	X	X	X
Reclamation	petition of 30% voters	by petition	Board petition	majority vote	X	X	X	X	2M	X
Groundwater Conservation	complex, petition	contiguous area		set by district's procedure	X	X	X	X	IM	
Rural Water	50% voter petition	by petition		$\frac{3}{4}$ voters petition	X	X	X	X	X	X
Public Power & Irrigation	15% voters petition	maintenance area	Enlarge by petition	voters petition & election	X	X	X	X	X	X
Mosquito Abatement	10% voters petition	include less than 100 voters	annexation by municipality	$\frac{2}{3}$ vote	X	X	X	X	IM	

CHART ILLUSTRATES DUPLICATION OF DUTIES, AUTHORITY

rural water districts³⁰⁴ or drainage districts³⁰⁵ can be organized.

The new NRDs have considerable power. On the financial side they have authority to levy a one mill tax, or higher amount if approved by a majority vote at a regular election, borrow money, act as a fiscal agent, and issue revenue bonds for financing construction of facilities.³⁰⁶ However, the legislature, by repealing the authorization in the original bill for general obligation bonds, has severely limited the ability of a district to raise funds for large projects. If fear of uncontrolled bond issuance is the delimiting consideration, it could be more practically solved either by limiting the amount of bonded indebtedness or by requiring a referendum for bond indebtedness in excess of a specified amount.³⁰⁷ To carry out the purposes of the act, a district may condemn property either within or outside its territorial limits. In the area of planning and operations, districts enjoy broad powers, including: (1) contracting for the construction and operation of reservoirs, diversion works, canals, drains, and other projects; (2) acquiring and disposing of water rights; (3) developing, storing and transporting water, and furnishing water service for domestic purposes, irrigation, milling, manufacturing, mining, metallurgical, and any other beneficial use; (4) establishing improvement project areas within the district to carry out projects with the cost assessed against the lands benefited; and (5) adopting rules and regulations to carry out the purposes of the act.³⁰⁸

One of the specified purposes of L.B. 1357 is "development, management, utilization and conservation of groundwater."³⁰⁹ Whenever the NRD board determines that regulations are necessary "to ensure the proper conservation of groundwater within the district," it must confer with the Department of Water Resources, the University Conservation and Survey Division, the Nebraska Natural Resources Commission, and the groundwater users within the district. A public hearing must then be held, followed by a referendum on the proposed regulations.³¹⁰ The regulations become effective upon approval by the eligible voters, described in the stat-

a serious constitutional question regarding regulations imposed on landowners who do not own wells.

304. NEB. REV. STAT. § 46-1001.01 (Cum. Supp. 1972).

305. NEB. REV. STAT. §§ 31-101.01, -301.01, -401.01 (Cum. Supp. 1972) (the cutoff date for drainage districts was Dec. 31, 1971).

306. NEB. REV. STAT. § 2-3226 (Cum. Supp. 1972).

307. Cf. COLO. REV. STAT. ANN. § 148-18-33(2) (Supp. 1965).

308. NEB. REV. STAT. § 2-3228 (Reissue 1970).

309. NEB. REV. STAT. § 2-3229 (Cum. Supp. 1972).

310. NEB. REV. STAT. § 2-3237(2) (Reissue 1970).

ute as all "existing groundwater well owners within the district, and only such owners."³¹¹

The legislature can vest in political subdivisions the power to govern local matters,³¹² but the provision that only well owners can vote is questionable.³¹³ While well owners have a particular interest in the rules regulating groundwater, in some cases it may be less than that of landowners who have not put in wells. One example is a referendum prohibiting further drilling in a particular area. Also, people who live in municipalities within a district have a valid concern with the problems of resource development and should be permitted to vote. The present voting arrangement granting decision making power to a group which stands to gain by its own decisions is biased and should be changed.³¹⁴

311. NEB. REV. STAT. § 2-3237(4) (Reissue 1970).

312. *Peterson v. Cook*, 175 Neb. 296, 121 N.W.2d 399 (1963). See also *Syfie v. Tri-County Hospital Dist.*, 186 Neb. 478, 184 N.W.2d 398 (1971); *Duerfeldt v. State*, 184 Neb. 242, 166 N.W.2d 737 (1969) (delegation of eminent domain power to the Games and Parks Comm'n).

313. For recent examples of United States Supreme Court decisions, see *City of Phoenix v. Kolodziejski*, 399 U.S. 204 (1970) (excluding non-property owners from elections for general obligation bonds invalid); *Cipriano v. City of Houma*, 395 U.S. 701 (1969) (property ownership requirement for voting in a municipal utility bond election invalid); *Kramer v. Union Free School Dist.*, 395 U.S. 621 (1969) (bachelor living with parents denied equal protection by statute limiting voter eligibility in school district election to either those owning or leasing taxable real property in district or parents of children enrolled in local public school). It should be noted that in *Kramer*, the Court said: "We need express no opinion as to whether the State in some circumstances might limit the exercise of the franchise to those 'primarily interested' or 'primarily affected.'" *Id.* at 632. In *Gordon v. Lance*, 403 U.S. 1 (1971), the Burger Court held that a requirement that 60% of voters in referendum election approve bonded indebtedness or tax increases does not violate equal protection. In this connection, the Court held in *Dusch v. Davis*, 387 U.S. 112 (1967), that it is proper to require candidates from particular districts, even though they vary widely in population, if the voting is at-large. In the opinion, Mr. Justice Douglas stated: "The plan does not preserve any controlling influence of the smaller boroughs, but does indicate a desire for intelligent expression of views on subjects relating to agriculture which remains a great economic factor in the welfare of the entire population." *Id.* at 116-17.

In *Associated Enterprises v. Toltec Watershed Improvement Dist.*, 41 U.S.L.W. 4397 (1973), the Court held valid the requirement that a watershed improvement district could be created only if a majority of landowners representing a majority of the acreage in the proposed district approved it. See also *Saylor Land Co. v. Tulare Water Dist.*, 41 U.S.L.W. 4390 (1973).

314. For a general discussion of bias resulting from an interest in the decision, see 2 K. DAVIS, ADMINISTRATIVE LAW § 12.03 (1958).

The act permits districts to establish advisory groups, to make studies, surveys and investigations, to do research, and to employ persons necessary to carry out the purposes of the act. These powers should be sufficient to enable compliance with a 1972 law requiring each NRD to prepare by August 1, 1975, both a comprehensive six-year and a one-year certain plan. The long-range plan is to be updated and a new one-year plan prepared annually, and both are to be filed with the Nebraska Natural Resources Commission to insure they are consistent with the long-range plans at the state level.

3. *Management Powers for Natural Resources Districts—An Appropriation, Permit System for Nebraska*

a. *Introduction*

The NRD areas, designated according to hydrologic patterns utilizing river basins,³¹⁵ are large enough to be separate units hydrologically³¹⁶ but of sufficient size for group community action³¹⁷ where smaller interests, particularly rural ones, can be assured of adequate regard.³¹⁸ One of the challenges is to work for mutually beneficial interaction among various groups. Another is to synthesize the abilities of specialists in diverse fields and come up with overall multi-purpose planning, including designs for conjunctive use of ground and stream waters. To accomplish these things, the newly formed entities will need sufficient authority.

In the following sections, a proposal is made for managing groundwater in Nebraska. Only mild restraints would be applied to water users in non-critical locations, but a control mechanism commensurate with problems which may arise is provided. In the first instance management is at the local level. However, if local people are unable or unwilling to resolve fundamental problems, the state can act. This is justified because resource matters are seldom altogether local and the state-wide community almost always has a cogent interest.³¹⁹ Even then, however, before state regulation

315. NEB. REV. STAT. § 2-3203(1) (Cum. Supp. 1972).

316. Address by V. Dreeszen, State Geologist, Neb. Section of the Am. Soc'y of Civil Eng'rs, in Omaha, Neb., Nov. 15, 1967.

317. R. LEONARD, GIANNINI FOUNDATION RESEARCH REP. NO. 279, INTEGRATED MANAGEMENT OF GROUND AND SURFACE WATER IN RELATION TO WATER IMPROVEMENT: THE EXPERIENCE OF LOS ANGELES COUNTY 78, 86 (U. of Cal. at Berkeley, 1964).

318. B. EVANS, CORNHUSKER ECONOMICS 2 (U. of Neb. Cooperative Extension Service, Aug. 11, 1971).

319. REPORT ON THE LAWS OF KANSAS PERTAINING TO THE BENEFICIAL USE OF WATER 57 (Kan. Water Resources Bd. Bull. No. 3, Nov. 1956,

takes place, local groups participate in discussing alternatives and deciding what should be done.

Some of the powers necessary to manage groundwater are set out in rule form with an accompanying commentary. This arrangement serves to highlight the fundamental issues. The rules are not meant to be conclusive or exhaustive, and no attempt has been made to include the many and various particulars necessary for a comprehensive statute.

b. *Permits*

NRDs should have the power to issue permits for the appropriation of groundwater and prescribe conditions for such issuance.³²⁰

Comment. A permit system for surface streams has been in effect for many years in Nebraska and the time has come to include groundwater.³²¹ In times of non-shortage a permit would issue automatically upon application as long as the proposed use would not substantially interfere with existing uses.³²²

Topeka, Kan.), cited in E. SHURTZ, REPORT ON THE LAW OF KANSAS PERTAINING TO GROUNDWATER 76 (Kan. Water Resources Bd. Bull. No. 5, Nov. 1960):

Local control and regulation is often sound and necessary. But it has its limitations. This is especially true in the area of water control. There are some areas of Kansas where the Texas system might work well. In other areas, the interrelation of ground and surface water would make such provisions unworkable. Modern science eschews distinctions not firmly grounded upon the hydrological cycle. Wise lawgivers recognize that sound law cannot ignore the recognized principles of that cycle. Further, future hydrological data may show the system inapplicable in some areas where landowners might undertake such control. Confusion and disruption could easily result.

The overlying landowners are not the only individuals interested or affected in ground-water development. Certainly the state as a whole has a paramount interest. A central agency will generally have the essential technical skill, powers, resources, and available coordinated data to plan and control state water development as a whole. And it will generally be free from the local political pressures and biases that often wreck the machinery of local control. Moreover, central administration will preclude the countless administrative problems and difficulties that necessarily arise from the very nature of a system of many local administrative units. For these reasons the Texas ground-water solution is not recommended at this time.

320. COLO. REV. STAT. ANN. § 148-18-7 (Supp. 1971). Cf. ARIZ. REV. STAT. ANN. § 45-313 (Supp. 1972); NEB. REV. STAT. §§ 2-3228 to -3229 (Reissue 1970); ORE. REV. STAT. § 537.685 (1971).

321. Nebraska's well registration statute, NEB. REV. STAT. § 46-605 (Reissue 1968), essentially satisfies one requirement for applying for a permit discussed *infra*.

322. Cf. MODEL WATER USE ACT § 407(b); HAWAII REV. LAWS §§ 177-22 to -25 (1968).

The question arises, why require a permit if it is granted mechanically? First, it establishes in the users' minds the idea of central regulation and administration of water resources.³²³ Second, the requirement allows for systematic accumulation of extensive data, so that when regulation becomes necessary sufficient information is at hand.³²⁴ Third, such a system has a substantial impact on the development of both new supplies of water and more efficient use of existing supplies.³²⁵ Fourth, permits greatly simplify the regulation of groundwater, especially among competing users, by identifying and recording present uses.³²⁶

A permit should be issued for a limited time, e.g., ten years,³²⁷ although a longer period might be permitted in special cases to guarantee amortization of an investment.³²⁸ By requiring a user to get a new permit, beneficial use can be rechecked periodically in light of evolving community standards and needs.

The content of the application for the permit should include, *inter alia*:

the nature of the proposed use, the location of the proposed well or other means of obtaining underground water, the depth to the water table, if known, the size, type, description and estimated depth of the proposed well, a description of the proposed pumping equipment if any and of the source of power, the estimated capacity in gallons per minute, the amount of water applied for, and, if said water is to be used for irrigation, the acreage and location by legal subdivision of the land to be reclaimed or for which supplemental water is to be sought, a description of any water right applicable to said land, and a description of the ditch, pipe or flume, if any, that will be used to transport said water to said land, and such other information as the local NRD may require.³²⁹

Domestic purposes should be protected;³³⁰ no permit should be required when diverting for domestic use,³³¹ changing from consumptive to non-consumptive use or digging a replacement well.³³² NRDs, however, could establish certain requirements by rule. For example, a permit might be required if the substitute installation is to be more than a specified distance from the old one.

323. HINES at 37.

324. *Id.*

325. *Id.*

326. TRELEASE-WIS. at 255.

327. See IOWA CODE ANN. § 455A.20 (1971). Provision is made to extend the permit. *Id.* MODEL WATER USE ACT § 406.

328. See generally 5 CLARK § 442.2.

329. WYO. STAT. ANN. § 41-138 (Supp. 1971).

330. MODEL WATER USE ACT § 409.

331. MODEL WATER USE ACT § 301.

332. NEB. REV. STAT. § 46-609 (Cum. Supp. 1972).

By allowing NRDs to prescribe conditions³³³ for issuance of a permit, minimal quantities of water or certain types of water can be exempted from the permit requirement in order to avoid unnecessary and burdensome procedures in minor cases.

(1) *Vested Rights*

A primary problem is how to constitutionally deal with existing users who have vested rights. The common rule today is that a landowner has no absolute ownership or vested right in groundwater underlying his land which has not actually been applied to a beneficial use.³³⁴ A change in the law which affects only those rights which will arise in the future does not impair vested property rights in or related to water.³³⁵ Existing rights, however, must be left relatively untouched or constitutional difficulties arise; changes which protect those presently using water are unlikely to encounter constitutional obstacles.³³⁶ Therefore, permits should be issued to all those making beneficial use of water at the date of the act. It has even been suggested that to insure constitutionality permits given these early users should not have to be renewed.³³⁷ But if a long enough time period for filing is given, the provision effectively becomes a non-use statute and constitutional problems are obviated.³³⁸

(2) *Procedure for Issuance of Permits*

The application for a water permit would be submitted to the NRD in the district where the proposed well is to be located. After evaluation, the NRD would send both the application and its evaluation to the Department of Water Resources. After consultation with the Nebraska Natural Resources Commission, the Department would either approve or reject the application. If approved, a copy of the application and permit would be sent to the NRD for filing. Although this is not the procedure under the present well registration system in Nebraska,³³⁹ the change is advisable to emphasize

333. MODEL WATER USE ACT § 405.

334. Leading cases are *Williams v. City of Wichita*, 190 Kan. 317, 374 P.2d 578 (1962); *Baeth v. Hoisveen*, 157 N.W.2d 728 (N.D. 1968); *Knight v. Grimes*, 80 S.D. 517, 127 N.W.2d 708 (1964). See Morton, *Groundwater Rights in Kansas*, 5 KAN. L. REV. 597, 603-06 (1957). For citations to cases and commentary, see Harnsberger at 752 n.155; 5 CLARK § 446 at 466-67.

335. CORKER at 231.

336. *Id.* at 233.

337. MODEL WATER USE ACT § 303.

338. HINES at 81.

339. The well driller's certificate and well owner's registration are sent directly to the Dep't of Water Resources with copies to local soil and water conservation districts. NEB. REV. STAT. § 46-604 (Reissue 1968).

the NRD's position as the local administrative agency. It is expected that the Department of Water Resources would rubber-stamp almost all applications on the basis of NRD evaluation. Nevertheless, the procedure has the built-in potential of comprehensive coordination at the state level and ultimate authority over well installation is placed there.

(3) *Subirrigation*

Because of the concern to develop and use groundwater only for beneficial purposes, permits should not be granted for natural "subirrigation" except in unusual situations.³⁴⁰ Subirrigation generally necessitates unrealistically high groundwater levels and for that reason the purpose is not beneficial.³⁴¹

(4) *Standard Conditions*

Permits should contain standard conditions to encourage conservation of water. Minimum criteria should be established to deal with return flow, a problem now handled on a piecemeal basis, and requirements to reduce waste must be developed.³⁴² A provision for modification of the permit terms whenever an area is declared critical would be essential. Material breach of a standard condition could result in revocation of the permit.³⁴³

340. Montana is one of the few states which issues a permit for "subirrigation." MONT. REV. CODES ANN. § 89-2913 (Supp. 1971).

341. *Baumann v. Smrha*, 145 F. Supp. 617 (D. Kan. 1956), *aff'd mem.*, 352 U.S. 863 (1956). In *Luchsinger v. Loup River Pub. Power Dist.*, 140 Neb. 179, 182, 299 N.W. 549, 550-51 (1941), the court said, "Subirrigation in the natural condition of land used for farming is a valuable right attached to the land itself." But in *Metropolitan Utils. Dist. v. Merritt Beach Co.*, 179 Neb. 783, 800, 140 N.W.2d 626, 636-37 (1966), the court recognized "it is becoming more important and extremely necessary" to regulate groundwater and see it is "reasonably used for a beneficial purpose without waste." In that this is impossible when groundwater is used merely to support a level at the root zone, *Luchsinger* should be overruled.

It is doubtful that an appropriative right could be obtained to water for subirrigation because there exists no "physical efforts of man resulting in visible diversion of water." See *State ex rel. Reynolds v. Miranda*, 83 N.M. 445, 493 P.2d 409 (1972).

342. This is consistent with modern legal systems where beneficial use is a fundamental parameter for appropriation. For examples of statutory definitions of waste, see NEV. REV. STAT. § 534.010(f) (1971); N.M. STAT. ANN. § 75-12-6 (Repl. 1968) (artesian waters); ORE. REV. STAT. § 537.620(3) (1971). Cf. MEYERS & TARLOCK at 110-11. See Clark, *Background and Trends in Water Salvage Law*, 15 ROCKY MT. MINERAL L. INSTITUTE 421 (1969).

343. Due process probably would require the NRD to prove a material breach at a hearing.

(5) *Prescriptive Rights*

Prescriptive rights³⁴⁴ should be eliminated.³⁴⁵ If they were allowed, an NRD would be unable to function as a central clearing-house for water-related information and problems. The only way to obtain a water right must be through a permit. For similar reasons, water rights should not be acquirable by adverse possession.³⁴⁶

c. *General Powers*(1) *Collection of Data*

NRDs should have the power to gather hydrological and scientific data, carry on investigations of all kinds, and correlate and analyze all relevant information by any appropriate means.³⁴⁷

Comment. Sound hydrological and scientific data are a fundamental prerequisite to any viable management plan.³⁴⁸ Much data is presently being accumulated at the state level from well drillers' certificates³⁴⁹ and well owners' registrations,³⁵⁰ but much more can be accomplished.³⁵¹ One of the most progressive steps occurred in

344. Prescriptive rights are rights acquired by use over a specified period of time. It is a common law concept, analogous to adverse possession.

345. HAWAII REV. LAWS § 177-3 (1968). For a discussion, see Harnsberger, *Prescriptive Water Rights in Wisconsin*, 1961 WIS. L. REV. 47.

346. UTAH CODE ANN. § 73-3-1 (Repl. 1968).

347. See NEB. REV. STAT. § 2-3232 (Reissue 1970).

348. FRAMEWORK STUDY at 266-68, *Recommendations* 22 and 25.

349. NEB. REV. STAT. § 46-603 (Reissue 1968). See Dep't of Water Resources, Form No. Irr. 57-3.

350. NEB. REV. STAT. § 46-605 (Reissue 1968). See Dep't of Water Resources, Form No. Irr. 57-1.

351. Well drillers should indicate permeability of strata penetrated. Cf. ORE. REV. STAT. § 537.765(2)(h)(i) (1971). To have a "living" picture of groundwater action, well owners also should file easy-to-prepare annual reports. For examples of other state statutes in a similar vein, see ARIZ. REV. STAT. ANN. § 45-304B (1956); HAWAII REV. LAWS § 177-5(4) (1968); NEV. REV. STAT. § 534.110 (1967); N.D. CENT. CODE § 61-04-03 (1960); WYO. STAT. ANN. § 41-126 (Supp. 1971). A semi-annual (spring-fall, or pre-pumping and post-pumping) check of the water level in a well would be a simple operation. Likewise, the total withdrawn during a pumping season could be calculated by simply multiplying the number of pumping hours by the withdrawal rate.

Domestic wells are now exempt from registration, NEB. REV. STAT. §§ 46-602(1), -605 (Reissue 1968), and should be exempt under a permit system. However, their location, depth to static-water level and perhaps permeability of strata penetrated in digging them should be reported and recorded. Wells used for stock on a farm or ranch are also now exempt from registration. Thus an irrigator has to

1969 when the legislature authorized the Natural Resources Commission to establish a water resources data bank. The bank is designed to record, *inter alia*, observations, calculations, and other information concerning climatological, meteorological, hydrologic, hydraulic, topographic and geologic conditions and phenomena as these affect surface and groundwater resources, developed water supplies, water demands and hydraulic structures.³⁵²

(2) Rules and Regulations

NRDs should have the power to issue and enforce reasonable rules and regulations for the purpose of conserving, preserving, protecting, and recharging groundwater.³⁵³

Comment. NRDs, as the local agencies engaged in groundwater management, should have rule making power. To achieve a degree of uniformity and compliance with the State Water Plan, all rules and regulations should be submitted to and approved by both the Natural Resources Commission and the Department of Water Resources. Unless the state agency rejected a proposed rule within a prescribed time, the rule would go into effect automatically. In the event of rejection, a hearing procedure and method for appeal to the courts would be necessary.

register a well he generally uses less than 90 days while stock watering installations of larger capacity used throughout the year are free of the obligation. Further, large cattle wells are often closely spaced which increases their depletive effect. To water 20,000 head of cattle annually would require three 1500-2000 gpm wells. Because of such quantities, domestic use should be limited to water for household pets and domestic animals kept for household sustenance. See N.D. CENT. CODE § 61-01-01.1(1) (Supp. 1971). Also, a volumetric limitation should be imposed, either in terms of a daily maximum withdrawal or a maximum diversion rate. IDAHO CODE ANN. § 42-230(d) (Supp. 1971) (13,000 gal.); ORE. REV. STAT. § 537.545 (1971) (15,000 gal.); UTAH CODE ANN. § 73-3-16 (1949, amended 1959) (less than 6.73 gpm.); WYO. STAT. ANN. § 41-138 (Supp. 1971) (less than 25 gpm).

352. NEB. REV. STAT. §§ 2-1568 to -1570 (Reissue 1970).

353. Cf. MODEL WATER USE ACT §§ 401-02.

To obtain data an NRD should have the authority to require the filing of plans, drawings and reports by all water users, Cf. HAWAII REV. LAWS § 177-5(4) (1968); NEV. REV. STAT. § 534.110 (1967); N.D. CENT. CODE § 61-04-03 (1960); ORE. REV. STAT. § 537.605 (1971); WYO. STAT. ANN. § 41-126 (Supp. 1971), and it should have authority to inspect wells at reasonable times for proper purposes which would include such tests as putting in harmless dyes or radioactive isotopes to trace groundwater movement. CAL. WATER CODE § 40-214 (West App. Supp. 1972); NEV. REV. STAT. § 534.130 (1971); S.D. COMP. L. ANN. § 46-5-30 (1967). Cf. NEB. REV. STAT. § 2-3232 (Reissue 1970).

It is anticipated that rules and regulations would cover such matters as limiting well construction to licensed and bonded drillers to prevent injury to reservoirs and insure collection of data, assuring optimum well spacing and minimum well interference, providing an adequate quality of domestic, agricultural and industrial water supplies, controlling flowing artesian wells to prevent waste and preserve pressures, plugging abandoned wells, and recording data.³⁵⁴ Many of these are presently dealt with by statute.³⁵⁵ The shortcoming with codifications is that the requirements become inflexible and thus unadaptable to particular needs in special areas. Thus, the legislature should establish minimum provisions and let NRDs issue more detailed requirements tailored to local needs.

(3) *Pollution*

NRDs should have the power to prohibit pollution and take necessary measures to control water quality within the district.

Comment. Effective controls for improving water quality can be achieved only through public agencies which have broad power, vast amounts of information and adequate financing. Court procedures are not well adapted for regulation of water pollution.³⁵⁶ NRD rules, however, can be helpful in coordinating activities and assisting in collection of data regarding such sources of pollution as feedlots, insecticides, herbicides, pesticides, fertilizers, and underground storage of gasoline. However, ultimate authority for planning, quality standards, surveillance and enforcement must be at the state level. Rules and regulations of the State Department of Health and of the State Department of Environmental Control will always preempt NRD authority.

All data acquired should be available to the public. MONT. REV. CODES ANN. § 89-2928 (Repl. 1964).

354. CORKER at xxxi, *Recommendation* No. 7. Cf. TEXAS WATER CODE ANN. §§ 52.101, -.120 (Vernon 1972).
355. Well spacing, NEB. REV. STAT. § 46-651 (Reissue 1968); artesian wells, NEB. REV. STAT. §§ 46-281 to -282 (Reissue 1968); plugging (capping), NEB. REV. STAT. § 46-602 (Reissue 1968); data, NEB. REV. STAT. § 46-605 (Reissue 1968).
356. See generally Johnson, *Regional Water Quality Management and Control*, in CONTEMPORARY DEVELOPMENTS IN WATER LAW 83 (C. Johnson & S. Lewis eds., 1970); Johnson, *The Changing Role of Courts in Water-Quality Management*, in WATER RESOURCES MANAGEMENT AND PUBLIC POLICY 196, 200 (T. Campbell & R. Sylvester eds., 1968); E. MURPHY, WATER PURITY (1961); Hines, *Nor Any Drop to Drink: Public Regulation of Water Quality* (pts. 1-3), 52 IOWA L. REV. 186, 432, 799 (1966); Note, *Water Pollution: Role of the Courts*, 1972 WASH. U.L.Q. 291.

(4) *Rotation and Exchange Agreements*

NRDs should have power to approve voluntary rotation³⁵⁷ and exchange agreements.³⁵⁸

Comment. Voluntary agreements for withdrawals, apportionment, rotation, exchange, or proration should be encouraged and promoted. After approval by the NRD, an agreement would control over existing restrictive orders and over conflicting provisions in permits. If an agreement should become inequitable because of changed conditions, or become detrimental to the public interest or to rights of persons not parties, it could be terminated after notice and a public hearing.³⁵⁹

(5) *Practical Adjustments*

NRDs should have power to require reasonable, practical adjustments between water users.

Comment. These may include requirements that an aquifer be recharged, that another user's means of withdrawal be deepened, reset, expanded or reconstructed, partially or entirely, at the expense of a prospective user, or that an alternative water supply be provided, partially or entirely, at the expense of the prospective user.³⁶⁰

(6) *Substitute Supply from District*

NRDs should have power to require use of water supplied by the district in lieu of groundwater diversions.

Comment. When necessary to recharge an area or put an efficient conjunctive use plan into operation, a district may prohibit the pumping of groundwater and offer to supply the user from other sources. When this is done, reimbursement of any losses incurred should be made.

(7) *Sales and Exchanges*

NRDs should have power to buy, sell or exchange water³⁶¹ or

357. Cf. WASH. REV. CODE ANN. § 90.03.390 (1962); WYO. STAT. ANN. § 41-132 (1957).

358. COLO. REV. STAT. ANN. § 148-21-21(5) (Supp. 1969). See also WYO. STAT. ANN. § 41-5 to -8 (1957).

359. ORE. REV. STAT. § 537.745 (1971); WYO. STAT. ANN. § 41-132 (1957).

360. This standard is taken from Legislative Bill 616A which was introduced in the Wisconsin Legislature during 1957. The drafter was Professor Jacob H. Beuscher of the U. of Wis. Law School. See *TRELEASE-WIS.* at 167, 194-95.

361. CAL. WATER CODE § 40-2(6) (West App. Supp. 1972).

water rights.³⁶²

Comment. Districts must be empowered to buy and sell both water and water rights in order to develop and conserve supplies. Without such power an NRD could do little but regulate private development and utilization. It could not initiate activity on its own, an obviously necessary capacity.

Exchanges are particularly useful when operating a conjunctive use system since trading water and water rights between sources is essential.

(8) *Taxes and Extraction Charges*

NRDs should have power to levy ad valorem taxes, pump taxes and extraction charges,³⁶³ including replenishment assessments³⁶⁴ and basin equity assessments.³⁶⁵

Comment. It is the power of taxation which makes public enterprises economically superior to individual private proprietors in undertaking the development, control and allocation of water resources. Thus, to be viable, NRDs will need a broad financial base.

An ad valorem tax, one levied on all assessable property in a district,³⁶⁶ does not prevent waste of resources.³⁶⁷ It does, however, tax those who benefit indirectly from the conserving and developing of natural resources by others.³⁶⁸ If only a special, distinct group of property owners are benefited, special ad valorem taxes can be levied.³⁶⁹ The maximum permissible tax should be small³⁷⁰ because there may be some justification for the feeling that the full statutory level will always be levied.³⁷¹

362. NEB. REV. STAT. § 2-3233 (Reissue 1970) authorizes Natural Resources Districts to "acquire and dispose of water rights."

363. Cf. CAL. WATER CODE § 40-2(12) (West App. Supp. 1972).

364. MEYERS & TARLOCK at 619-20.

365. *Id.*

366. See NEB. REV. STAT. § 2-3225 (Cum. Supp. 1972).

367. V. Cline, Cal. Dep't of Water Resources, Groundwater Management—Legal and Organizational Considerations 6 (mimeographed paper prepared for Office of the Chief Counsel, Cal. Dep't of Water Resources, Oct. 28, 1971) [hereinafter cited as V. Cline].

368. *Id.*; CORKER at xxxii.

369. *E.g.*, Orange County Water Dist., Cal., has a special ad valorem tax called a Water Reserve Fund which is levied on property other than mineral rights. CAL. WATER CODE § 40-17 (West App. 1968). The assessment, which provides funds to purchase water to reduce the accumulated overdraft, is being phased out.

370. *E.g.*, NEB. REV. STAT. § 2-3225 (Cum. Supp. 1972) (1 mill); COLO. REV. STAT. ANN. § 148-18-31 (Supp. 1965) (.5 mill); CAL. WATER CODE § 40-17 (West App. 1968) (.8 mills).

371. *E.g.*, Orange County Water Dist., Cal., has historically levied a maximum .8 mill. MEYERS & TARLOCK at 619.

A true pump tax is simply a tax on the pump.³⁷² By taxing the pump the *ability* of the user to extract groundwater is taxed. An obvious effect is to reduce the number of unnecessary wells and to encourage the capping of unnecessary or obsolete wells.

An extraction charge, often called a pump tax,³⁷³ is a tax on the *amount* of water pumped or extracted. This is an important means of properly controlling pumping and equitably distributing the costs of supplemental water if the resources of the basin are inadequate.³⁷⁴ Thus an extraction charge is necessary primarily when the recharge rate of the groundwater basin is significantly less than the extraction rate. When a district uses an extraction charge to finance replenishment of water in a basin, the charge is especially equitable because the costs of replenishing and regulating are paid by those who principally benefit.³⁷⁵

At least two types of extraction charges should be levied to achieve essential fairness.³⁷⁶ A tax imposed on amounts used will help prevent waste.³⁷⁷ This type of charge fails to recognize, however, that many users have water rights based on beneficial use. Hence, a second extraction charge should be levied on water appropriated over and above the diverter's set water rights or his allocable share of the safe yield of the basin.

A basin equity assessment is employed by the Orange County Water District in California to ensure that the costs of conjunctive use in a limited aquifer are borne equitably by all users.³⁷⁸

(9) *Eminent Domain*

NRDs should have power to exercise the power of eminent domain, including the power to condemn water rights whenever necessary for development, conservation or allocation of water, or for the effective operation and management of the district.³⁷⁹

372. Cf. COLO. REV. STAT. ANN. § 143-18-31 (Supp. 1971) (special assessment on all wells according to pump capacity, maximum of 5¢ per gal. of pumping capacity).

373. V. Cline, *supra* note 367; Kreiger & Banks, *Groundwater Basin Management*, 50 CAL. L. REV. 56, 65 (1962) [hereinafter cited as *Groundwater*].

374. *Groundwater*, *supra* note 373, at 65.

375. CORKER at xxxii.

376. For a discussion of Orange County Water District of California assessments, see MEYERS & TARLOCK at 620.

377. V. Cline, *supra* note 367.

378. MEYERS & TARLOCK at 620-21.

379. Cf. NEB. REV. STAT. § 2-3234 (Reissue 1970); CAL. WATER CODE § 40-2 (6), (10) (West App. Supp. 1972).

Comment. To effectively deal with water resources, an NRD must have the physical facilities, including land, which are necessary to operate and carry out district purposes. A good deal of land is required to build a dam, canal, flood control, or irrigation project and often it cannot be voluntarily obtained. Also, it is essential that a district be able to take water rights by eminent domain if necessary to regulate groundwater in times of shortage and to permit furnishing alternative supplies.

The power should be exercisable both inside and outside a district's boundaries. If water is obtained outside, transportation facilities must be built. In a similar vein, the NRD for North Platte might have to condemn the water right of an appropriator near Grand Island to operate a conjunctive system. Exercise of the powers would, of course, be subject to all constitutional limitations, including payment of just compensation.

(10) *Minimum Stream Flows*

The Natural Resources Commission and NRDs with the permission of the Commission should have the power to file and hold for public use sufficient water of any natural stream to maintain a constant stream flow,³⁸⁰ to require maintenance of minimum lake levels,³⁸¹ to deny applications for permits when necessary to preserve wild and scenic rivers,³⁸² and to protect the public interest, including fish, wildlife and recreation uses.³⁸³

Comment. Since NRDs are multi-purpose entities, they should represent and encourage public as well as private interests. The

380. Cf. COLO. REV. STAT. ANN. § 150-7-5(10) (1963); MEYERS & TARLOCK at 210-11 and statutes cited therein.

381. Cf. MICH. COMP. LAWS ANN. § 281.61 to .86 (1972); MEYERS & TARLOCK at 765-67.

382. Cf. MEYERS & TARLOCK at 876-86. The federal government is working toward this with the Wild and Scenic Rivers Act of 1968, 16 U.S.C. §§ 1271-87 (1970).

383. For a definition of "fish, wildlife and recreation uses," see F. TRELEASE, A WATER CODE FOR ALASKA 43 (1962). Such "uses"

include impoundment of water for fish propagation, for fish and wildlife habitat and feeding grounds, and for commercial fishing opportunities and sport fishing, hunting, boating and other recreational opportunities; retention of minimum impoundments in multipurpose dams to protect and preserve fish; impoundment of water for release into a stream during periods of low flow to provide for migration, habitat and spawning of commercial and sport fishes.

Id. The provision for augmenting flows is unique but was justified, according to Professor Trelease, because of Alaska's extreme flow variations.

public concern in water for recreation has grown tremendously within recent years and the term "beneficial use" should include appropriations for the public.³⁸⁴

(11) *Perched Water Tables*

NRDs should have power to protect domestic users of perched groundwater.

Comment. A perched water supply is reservoir water occurring beneath the surface of the earth, other than subflow, which is separated from the primary groundwater basin of the area by an impervious geological formation which prevents a commingling of the two stocks. Owners of wells penetrating the impervious base of a perched supply should exercise reasonable care to insure that their installations are constructed to keep perched water from draining into the lower basin. In the event the reasonable care required is not taken, a practical adjustment should be sought.

d. *Critical Areas*

NRDs should have power to declare critical areas and zones and subzones therein.

Comment. There are numerous and varied criteria for declaring an area critical. These include whether the recharge rate is the same as or less than the rate of withdrawal,³⁸⁵ groundwater withdrawals are excessive,³⁸⁶ there is insufficient groundwater for a reasonably safe supply,³⁸⁷ waste of groundwater is taking place,³⁸⁸ there are disputes over groundwater use or priority, including well interference,³⁸⁹ pollution is occurring,³⁹⁰ the public health, safety or welfare is threatened,³⁹¹ or other adverse conditions exist.³⁹²

384. See F. TRELEASE, A WATER CODE FOR ALASKA 42 (1962).

385. MONT. REV. CODES ANN. § 89-2914 (Repl. 1964); ORE. REV. STAT. § 537.730 (1971); WASH. REV. CODE ANN. § 90.44.130 (1962); WYO. STAT. ANN. § 41-129 (1957). Washington also establishes a minimum groundwater level, WASH. REV. CODE ANN. § 90.44.230 (1962).

386. MONT. REV. CODES ANN. § 89-2914 (Repl. 1964); ORE. REV. STAT. § 537.730 (1971).

387. IDAHO CODE ANN. § 42-233a (Supp. 1971) (insufficient for irrigation); OKLA. STAT. ANN. tit. 82, § 1002 (1970); WASH. REV. CODE ANN. § 90.44.130 (1962); UTAH CODE ANN. § 73-5-1 (Repl. 1968).

388. ORE. REV. STAT. § 537.620 (1971); WYO. STAT. ANN. § 41-129 (1957).

389. MONT. REV. CODES ANN. § 89-2914 (Repl. 1964); ORE. REV. STAT. §§ 537, 537.730, 620 (1971); WYO. STAT. ANN. § 41-129 (1957).

390. ORE. REV. STAT. § 537.730 (1971).

391. HAWAII REV. LAWS § 177-33(a) (1968); UTAH CODE ANN. § 73-6-1 (Repl. 1968).

392. WYO. STAT. ANN. § 41-129 (1957).

An area would be declared critical if one of the criteria existed.³⁹³ To determine this, an NRD would initiate investigations whenever its board decided a situation justified doing so, or when a specified number of residents in an area requested an investigation.³⁹⁴ Appeal from any NRD action or decision could be made to a state board of water experts.³⁹⁵ If the state board ruled that no critical area should have been designated, its decision would be reviewable as an administrative decision in the district court for the district in which the purported critical area was to be located.³⁹⁶

In addition to serving as the initial appeal body, the state board could itself begin the proceedings³⁹⁷ by asking an NRD to make an investigation and report its evaluation of the problem.³⁹⁸ In the case of a recalcitrant NRD, the state board would be empowered to designate an area, zone or subzone critical³⁹⁹ and thereafter exercise all powers of an NRD. Expenses would be assessed to the NRD which neglected or refused to act.

e. *Special Powers in Critical Areas*

NRDs should have authority to exercise the following powers in critical areas:

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393. In states where groundwater problems may not be acute, a critical question will be the identification of a critical area. For an example of the possible problems, see *State ex rel. Tappan v. Smith*, 92 Idaho 451, 444 P.2d 412 (1968). Cf. ARIZ. REV. STAT. ANN. § 45-308 (1956).
394. Cf. ARIZ. REV. STAT. ANN. § 45-308 (1956); MONT. REV. CODES ANN. § 89-2914 (Repl. 1964); NEV. REV. STAT. § 534.030 (1971); OKLA. STAT. ANN. tit. 82 § 1007 (1970); ORE. REV. STAT. § 537.730 (1971); UTAH CODE ANN. § 73-5-1 (Repl. 1968); WASH. REV. CODE ANN. § 90.44.130 (1962); WYO. STAT. ANN. § 41-132 (1957).
395. The board could, for example, be composed of: (1) a licensed engineer appointed by the Dep't of Water Resources, (2) a licensed engineer, licensed attorney or a hydrologist chosen by the Neb. Natural Resources Comm'n, and (3) a qualified engineer, geologist or hydrologist from the Conservation and Survey Div. of the U. of Neb.
396. Cf. HAWAII REV. LAWS § 177-12 (1968); UTAH CODE ANN. § 73-5-1 (Repl. 1968); WASH. REV. CODE ANN. § 90.44.215 (1962); WYO. STAT. ANN. § 41-135 (1957).
397. ARIZ. REV. STAT. ANN. § 45-308 (1956); HAWAII REV. LAWS § 177-33 (1968); IDAHO CODE ANN. § 42-233a (Supp. 1971); NEV. REV. STAT. § 534.030 (1967); OKLA. STAT. ANN. tit. 82, § 1007 (1970); ORE. REV. STAT. § 537.730 (1971); UTAH CODE ANN. § 73-5-1 (Repl. 1968); WASH. REV. CODE ANN. § 90.44.130 (1962); WYO. STAT. ANN. § 41-132 (1957).
398. Cf. WYO. STAT. ANN. § 41-129 (1957).
399. WASH. REV. CODE ANN. § 90.44.130 (1962). The power to designate zones and subzones permits different controls and avoids problems of equal protection.

(1) close the area to further permits until there is again unappropriated water,⁴⁰⁰ and ban the digging of new nondomestic wells;⁴⁰¹

(2) prohibit the drilling of domestic wells where water can be furnished from a municipal or district supply;

(3) apportion total withdrawals according to priorities;⁴⁰²

(4) issue temporary permits revocable at will;

(5) order junior users to cease or reduce withdrawals;

(6) require and specify a system of rotation or exchanges of water;⁴⁰³

(7) grant preferences⁴⁰⁴ without regard to priorities, first to domestic and livestock users and thereafter to such other beneficial uses as the district's board of directors believes advisable;

(8) require meters or other measuring devices on all ground-water uses, including domestic;⁴⁰⁵

(9) require users to file reports containing information regarding withdrawals in the form requested by the district; and

(10) adopt all rules and regulations which may be necessary or desirable to carry out the foregoing powers in a critical area, or to protect the public welfare, health and safety.

f. *Litigation*

NRDs should have power to intervene in any action in law or equity, or any administrative hearing, when an issue is raised con-

400. HAWAII REV. LAWS § 177-33 (1968); IDAHO CODE ANN. § 42-233a (Supp. 1971); MONT. REV. CODES ANN. § 89-2918 (Repl. 1964); NEV. REV. STAT. § 534.120 (1967); ORE. REV. STAT. § 537.735 (1971); WYO. STAT. ANN. § 41-132 (1957).

401. Domestic wells do not require a permit. HAWAII REV. LAWS § 177-33 (1968); NEV. REV. STAT. § 534.120 (1967).

402. HAWAII REV. LAWS § 177-33(a)(2) (1968); IDAHO CODE ANN. § 42-237a(g) (Supp. 1972); MONT. REV. CODES ANN. § 89-2915 (Repl. 1964); ORE. REV. STAT. § 537.735 (1971); UTAH CODE ANN. § 75-5-1 (Repl. 1968); WASH. REV. CODE ANN. § 90.44.180 (1962); WYO. STAT. ANN. § 41-132(2) (1957).

403. Cf. ORE. REV. STAT. § 537.735 (1971). For a concise discussion of this power, see MEYERS & TARLOCK at 108.

404. Allocation decisions would consider the statutory preference scheme, NEB. REV. STAT. § 46-613 (Reissue 1968).

405. N.D. CENT. CODE § 61-04-27 (Supp. 1971). Domestic users are included because their diversions from a shallow aquifer can have important effects even under a restricted definition of domestic use. CORKER at xxxii.

cerning water rights, well interference, water pollution, diminution of basin water quantity or quality, transportation of water or like issues which arise in or are directly connected to the basin or anyone subject to the authority thereof. NRDs should have power to develop factual data for such decision making processes to enable the various tribunals to make a decision in light of the water resource policies established for that basin, and to pay the reasonable costs and expenses therefore.⁴⁰⁶

Comment. In actions involving water rights and related issues, a major problem is getting evidence. Commonly the one with the burden of proof on an issue loses.⁴⁰⁷ Enabling a water district to intervene and offer independent data, plus opinion evidence, would increase the number of fair results and also enable the tribunal to arrive at a practical solution of its own.⁴⁰⁸ In addition, intervention by an NRD would alleviate the possibility of a decision entirely discordant with the overall state water plan.

g. Lobbying and Public Relations

NRDs should have the power to spend reasonable amounts for representing the interests of the district before administrative agencies, legislative bodies and other governmental groups.

Comment. Inevitably, administrative and legislative matters which affect a district will be considered and acted upon. A district therefore must supply factual information, advance policy arguments, draft and evaluate proposals, and perform whatever services are necessary so that administrators and legislators can understand the district and its problems. The district must also perform an ambassadorial function in bargaining for the population of its area.⁴⁰⁹ There is, in addition, a responsibility to see that public issues are correctly framed since a false public definition of problems can have tragic consequences.⁴¹⁰

406. Cf. CAL. WATER CODE § 40-2(9) (West App. Supp. 1972).

407. CORKER at 149.

408. The power of the trial court to do so is apparently well established. *City of Lodi v. East Bay Mun. Util. Dist.*, 7 Cal. 2d 316, 60 P.2d 439 (1936). See also *Rancho Santa Margarita v. Vail*, 11 Cal. 2d 501, 81 P.2d 533 (1938); *Peabody v. City of Vallejo*, 2 Cal. 2d 351, 40 P.2d 486 (1935); *MacArtor v. Graylyn Crest III Swim Club*, 41 Del. Ch. 26, 187 A.2d 417 (1963).

409. Maass, *Public Investment Planning in the United States*, in WATER SPECTRUM 6 (Spring 1970). See *Thiles v. County Bd.*, 189 Neb. 1, — N.W.2d — (1972).

410. See E. Banfield, *Must We Live in Unheavenly Cities?*, in CURRENT 44, 47 (June 1970).

h. *Conjunctive Use*

Nebraska should encourage conjunctive use by giving NRDs and public power and irrigation districts the power to store water in underground basins; acquire, operate and augment groundwater supplies within the district; remove water from storage on an interim or permanent basis; and acquire, operate and maintain all facilities necessary or desirable for using water conjunctively.⁴¹¹

Comment. "Appendix A," a study of Nebraska's largest irrigation project, The Central Nebraska Public Power and Irrigation District, highlights some of the principal problems arising from operating groundwater reservoirs conjunctively with surface waters.

IV. CONCLUSION

A 1963 article discussing Nebraska groundwater problems concluded with the following statement which is as applicable now as it was then.

Should a public administrative control type statute be adopted (a) to integrate management of all interrelated surface and underground water so that the rights between the users of each can be correlated, (b) to give greater assurance of adequate supplies for increasing urban populations, and (c) to prevent conflicts between users of underground water in areas where there is danger of overdrafts, and to protect well owners who already have made large investments? In this connection, no requirements other than data reporting and proof of present use should be applicable to problem-free regions, and the rights of those now utilizing water should not be affected. However, when areas become overdrawn or "critical," corrective measures should be taken. . . . As in the case of Nebraska's surface waters, there are many advantages in clearly specifying a landowner's rights and preventing later users from infringing upon them in times of shortage.

Lawyers can draft legislation to change institutional arrangements, but before this is done the people must decide upon the goals they desire to achieve by choosing between alternative values.⁴¹²

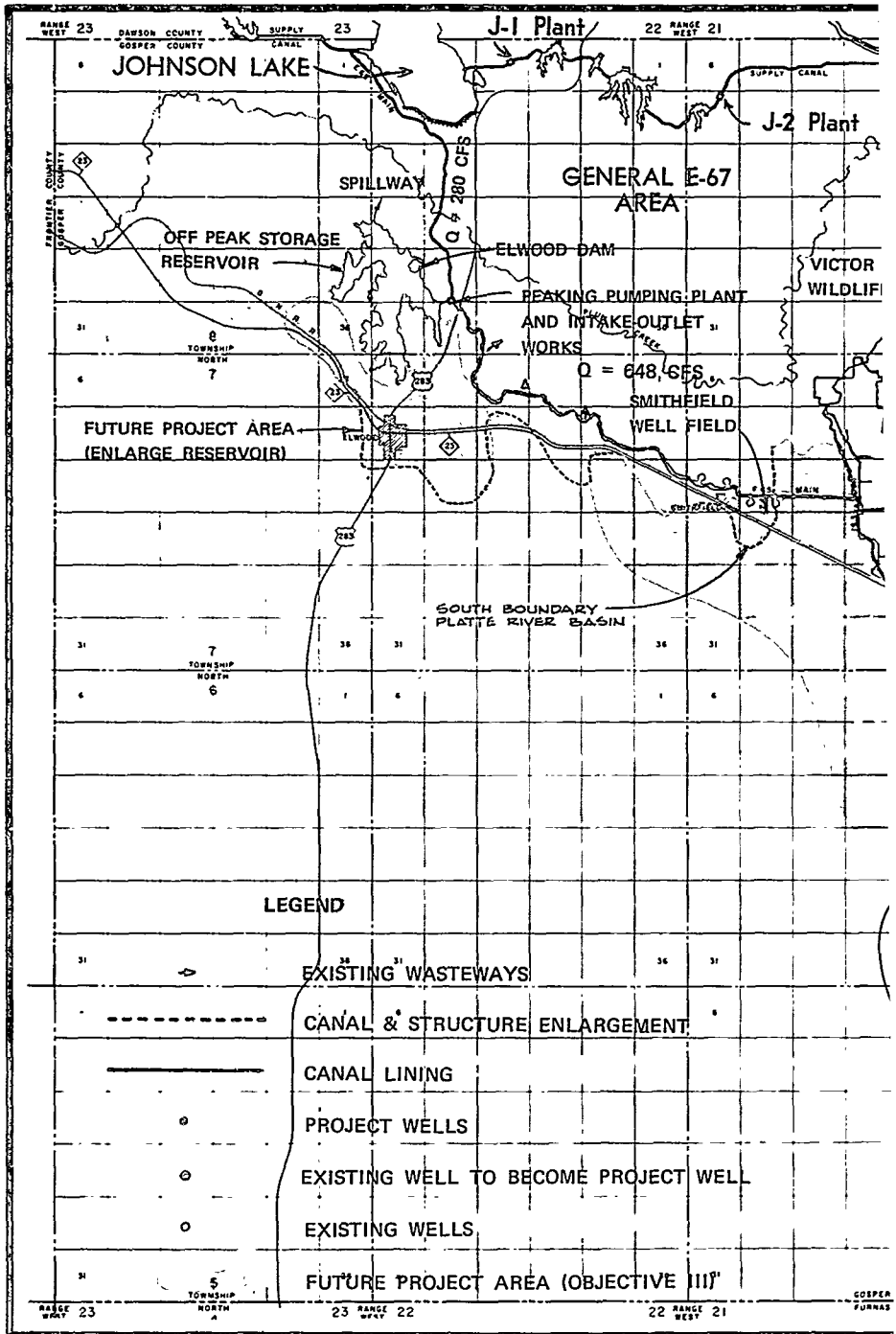
411. Cf. CALIF. WATER CODE § 60230(6) (West 1966); Teerink, *Utilization of Both Ground and Surface Waters*, 60 J. AM. WATER WORKS ASS'N 809, 814 (1968); Valentine, *Groundwater Management For the Nation's Future—Effecting Optimum Ground-Water Basin Management*, 90 J. OF THE HYDRAULICS DIV., PROCEEDINGS OF THE AM. Soc'y OF CIVIL ENG'RS 97, 104 (No. HY4, July, 1964).

412. Harnsberger at 764. See also Clark, *Groundwater Management: Law Local Response*, 6 ARIZ. L. REV. 178 (1965).

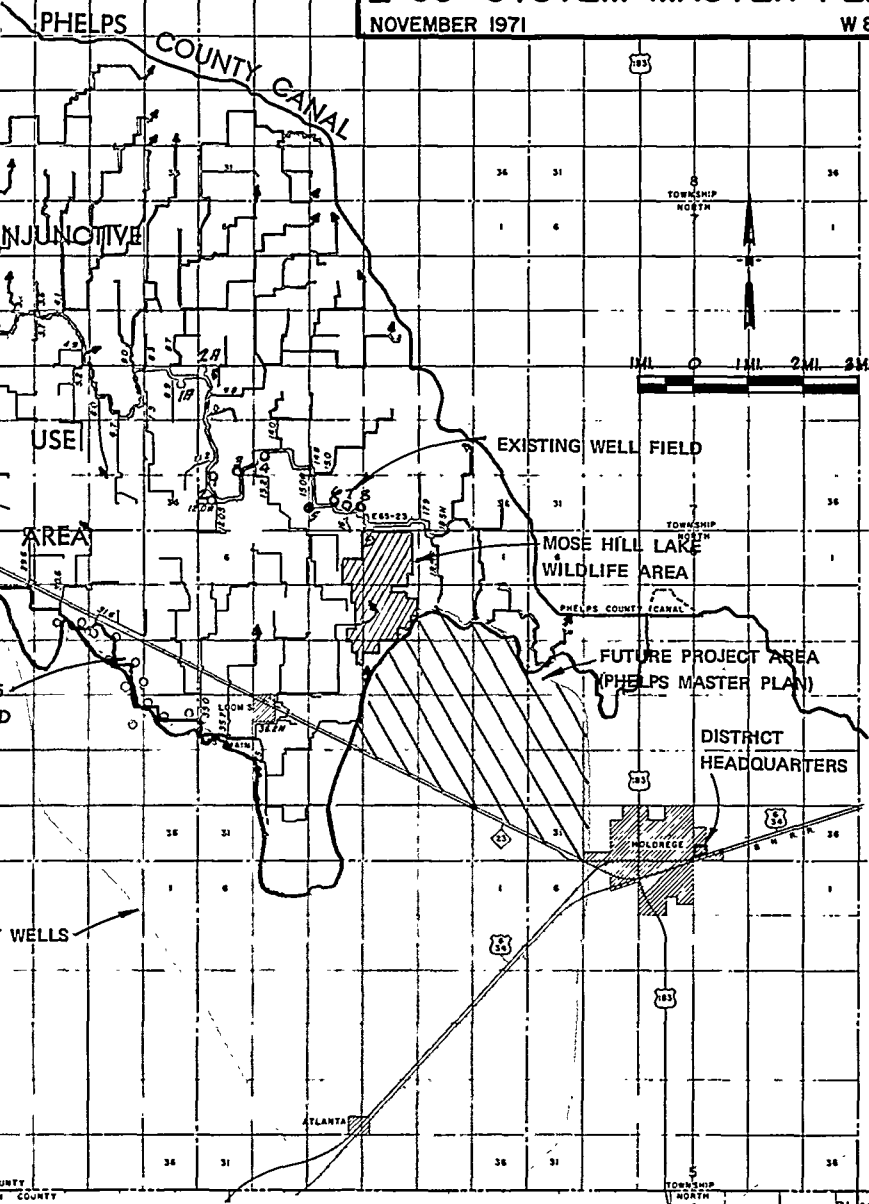
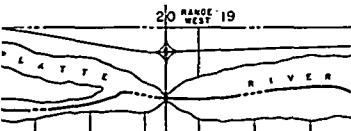
In most places where man has interfered with the natural water situation, the effects of overdevelopment did not become evident until many years had gone by and then it was

too late to effectively remedy the situation. If we wish to avoid finding ourselves with a similar problem, we must face up to the fact that cooperative efforts and laws governing water developments are a necessity. However, it should be kept in mind that *laws neither create nor restore water, so the basic need is not for laws, but rather for good management.*

C. KEECH, RELATION OF GROUND-WATER WITHDRAWALS TO THE WATER SUPPLIES IN NEBRASKA 6 (U.S. Geol. Survey Open-File Rep., U. of Neb., 1962) (emphasis added).



CENTRAL NEBRASKA PUBLIC POWER
AND IRRIGATION DISTRICT
PROPOSED IMPROVEMENTS
E 65 SYSTEM MASTER PLAN
NOVEMBER 1971 W 81.02



COUNTY
AND COUNTY

APPENDIX

CONJUNCTIVE USE
AN ILLUSTRATIVE CASE: THE CENTRAL NEBRASKA
PUBLIC POWER AND IRRIGATION DISTRICT

Institutional Lag

History shows that all too often technological change occurs initially without legal restraints and without an overall institutional plan. Thus disputes in the private sector, and also conflicts between private concerns and the public interest, are either settled by piecemeal litigation or by persons voluntarily relinquishing their claims. Judicial action seldom alleviates underlying problems; however, the possibility of a judicial remedy frequently provides enough stability to maintain adequate levels of investment and expansion in the short run. But if continued growth challenges the stability offered by the decision making machinery, pressure mounts for a systematic legal framework. Large public entities, and numerous small investors, demand a legal model based on well drafted statutes which are responsive to their perceived needs. The efforts of the large municipalities in eastern Nebraska to protect their well fields and investments is a vivid illustration.¹ Likewise the entire groundwater picture shows how gradual technological change and resulting resource development leads to conflicts of increased magnitude, frequency and irresolution. Only recently, however, has it become apparent that the judicial and legislative treatment of ground and surface waters as separate, distinguishable sources of supply is no longer acceptable. Provision must be made for integrated or "conjunctive use" of ground and surface waters.²

Conjunctive Use

When a groundwater basin is operated jointly with surface water supplies, the resultant integrated management system usually is referred to as "conjunctive use." Precipitation over the area, surface and sub-surface inflows, and surface and groundwater storage must be balanced against evaporation, evapotranspiration, runoff, and surface and subterranean outflows in order to get maximum benefits at a minimum cost. The supply most abundant at the time and place of demand should be used. For example, under ideal conditions, upstream users would have prior rights to surface flows and those downstream would be compensated by ground water.³ Ideal situations are uncommon. For any plan to work efficiently, however, water must be stored in ground reservoirs during periods of high precipitation and runoffs, and pumped later during dry spells when stream flows are insufficient.

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1. See the City, Village and Municipal Corporation Ground Water Permit Act, NEB. REV. STAT. §§ 46-638 to -650 (Reissue 1968).
 2. Committee on Water Laws of the Irrigation & Drainage Div., *General Statement of Principles to be Included in State Water Rights Laws*, 98 J. IRRIGATION & DRAINAGE DIV., PROCEEDINGS OF THE AM. SOC'Y OF CIVIL ENGR'S 318 (No. IR2, June 1972).
 3. R. Waddington, *Conjunctive Use of Ground and Surface Water in the Central Platte Valley of Nebraska 1968* (unpublished paper prepared for Dep't of Civil Eng'r, U. of Neb., Lincoln).

Those managing The Central Nebraska Public Power and Irrigation District (hereinafter called Central),⁴ have recently completed a three year conjunctive use study.⁵ The study, called the E-65 Master Plan, will be considered subsequently. Whether it will be implemented is a matter of great concern because Central's accomplishments are important to the socioeconomic future of the state, and its proposed system may hold the key not only to the future development of its project but also to others in the region. Storing runoff water and reducing well pumpage to build up groundwater levels in times of high precipitation is no different than the planned utilization of a surface reservoir like Lake McConaughy, presently operated by Central. Central constantly stores and releases water from the lake behind the Kingsley Dam to obtain maximum irrigation and power generation. If the level of the lake were kept continually at the top of the dam, surface supplies downstream would be inadequate to provide water when irrigators needed it.

Central's goal is to make the most effective use of all water within its boundaries. To do this, groundwater reservoirs must be operated conjunctively with surface supplies. In achieving this, many of the problems will be legal, not physical.⁶ A legal framework is accordingly necessary. Central's operation shows the need for a legal framework.

A Sketch of Central

Central, as promoted, was to provide irrigation service to lands within Gosper, Kearney, Phelps, and Adams counties. However, in 1936 the Nebraska Supreme Court, in *Osterman v. Central Nebraska Public Power & Irrigation District*,⁷ prohibited it from making transbasin diversions. This denied Central the right to serve any of Adams County, two-thirds of Kearney County and about one-half of Phelps County. Four years after this setback, the main supply canal was opened and by 1941 full scale irrigation began. The first power was produced when Sen. George W. Norris closed the switch on the Jeffrey Canyon Power Plant on Jan. 5, 1941, and by April Central's other two hydro plants were in operation.

The principal properties of Central consist of (1) Kingsley Dam and Lake McConaughy north of Ogallala; (2) the diversion dam near North

4. The district also is commonly called "Tri-County." The original area included only Kearney, Phelps and Gosper counties. For a history of Central, see G. HAMAKER, *IRRIGATION PIONEERS: A HISTORY OF THE TRI-COUNTY PROJECT* (1964 ed.). See also R. Canaday, *Historical Data and Policies of Central District in Its Relations with Other Districts*, April 16, 1962 (an unpublished paper addressed to the Central Bd. of Directors).

5. CORNELL, HOWLAND, HAYES & MERRYFIELD—CLAIR A. HILL & ASSOCIATES, *PROJECT REPORT FOR CENTRAL NEBRASKA PUBLIC POWER AND IRRIGATION DISTRICT: E-65 MASTER PLAN* (Nov. 1971) [hereinafter cited as CH₂M/HILL].

6. See Jenkins & Moulder, *Ground-Water Technology and Litigation Problems*, 88 J. IRRIGATION AND DRAINAGE DIV., PROCEEDINGS OF THE AM. SOC'Y OF CIVIL ENG'RS 21, 32 (No. IR2, June 1962). See also H. THOMAS, *THE CONSERVATION OF GROUND WATER* 243 (1951). For a discussion of economic considerations, see G. Jones, *The Diffusion of Agricultural Innovations*, in *READINGS IN RESOURCE MANAGEMENT AND CONSERVATION* 475, 479-80 (I. Burton & R. Kates eds. 1965).

7. 131 Neb. 356, 268 N.W. 334 (1936).

Platte; (3) the 76 Miles Supply Canal on which are located 26 lakes and 3 hydro-electric power plants; (4) 120 miles of irrigation canals; (5) 590 miles of distribution laterals; and (6) the 100,000 kilowatt Canaday Steam Plant.

Lake McConaughy is formed by the water backed up by the Kingsley Dam across the North Platte River. The earthen dam, completed in 1941, is 162 feet high and 3.5 miles across. At full storage (1,948,000 acre feet) the lake is 22 miles in length, 4 miles wide for some distance above the dam, and 142 feet deep near the dam. It has a shore line of 105 miles and a surface area, when at capacity, of 35,000 acres. Since the dam was closed in 1941, Lake McConaughy has been filled to capacity 3 times, 1951, 1967 and 1971. On July 12, 1971, it held 1,919,600 acre feet; its low was 383,000 acre feet in 1956.

The irrigation system within Central's jurisdiction consists of 3 separate feeder canals with a combined length of 120 miles, and 590 miles of distribution laterals. (The Master Plan Improvements Map on pages 282-83 shows the location of the district canals and wells which are referred to in this appendix.) The system supplies water for 113,787 acres of land in the Central area of Gosper, Phelps and Kearney counties. The first feeder canal (designated E-65 on the Master Plan Map) takes its water from the system just above the inlet to Johnson Lake. This 54.7 mile canal, with its 194 miles of distribution laterals, brings water to 33,454 acres, most of which are in the Loomis and Bertrand area. The second canal (located in E-67 general area on Master Plan Map), completed in 1954, is the latest addition to the system. It is 9.34 miles long, and 16 miles of distribution laterals carry water to 5,731 acres in Gosper County. The diversion is made just above the J-1 power plant. The Phelps County Canal, the district's main irrigation canal, is 56.7 miles long. Its headgate joins the supply canal below the J-2 power plant and it ends 6 miles west of Heartwell. It brings water to 74,602 acres of land in Phelps and Kearney counties by means of 380 miles of distribution laterals.

In 1954, the district completed installation of 10 irrigation wells north of Loomis to supplement deliveries to farmers and to help regulate water deliveries at the lower part of Lateral E-65. These wells, on the average, are spaced one-half mile apart; approximately 70 acre feet of water per day are pumped into the lateral from the 10 wells. This water is carried an average distance of 2 miles through the district's system and then delivered at the farm turnouts.

The most recent major innovation is a \$1.5 million automation system which permits one man located at the Control Center in Gothenburg to operate the 3 hydro plants, the diversion dam and the supply canal. A microwave communication network ties the system together.

In addition to the obvious benefits stemming from a project like Central (irrigation, electricity and recreational opportunities) there are many subtle benefits. One collateral benefit is flood control. Even at full storage, Lake McConaughy has sufficient capacity to disperse and hold North Platte River flood waters until downstream danger has passed.⁸ Likewise, 2,000 cfs or more of the South Platte water can be diverted into the system and detained until the river recedes.

8. This might not be so if excessive amounts of precipitation in western Nebraska and in Wyoming combined simultaneously with abnormally large amounts of runoff due to melting snow in the mountains.

The availability of Lake McConaughy storage water affects the watershed supply first, by furnishing irrigation water that otherwise would pass through the state as excess flow, and second, by providing a vehicle to carry upstream natural flow water down the river without disastrous seepage or evaporation losses. The appropriations of downstream high priority irrigators like those on the Kearney Canal are undiminished because the natural flow rides the storage water "piggyback" down the river. There also is natural flow which otherwise would not be present. Before construction of Kingsley Dam the gauging station at Overton registered an average of 43 zero-flow days each year. In 1934, there were 201 zero-flow days; since 1941, there have been none.⁹

This benefits upstream junior interests which would otherwise have to release their water in a vain attempt to get it to downstream canals with higher priorities.

Estimates of the increase in farm income in the Platte Valley, occasioned by better water management resulting from the Central project, range from \$15 to \$25 million each year. It can readily be seen how the project aids the entire state by increasing tax revenues from the area. The benefits are multiplied as the income generated is ultimately distributed to merchants, truckers, railroads, wholesalers, manufactures, and others serving the water users.

Matters of Concern

Despite ownership of substantial properties and large recent expenditures to upgrade service, Central has reached the point where conjunctive use is the only practical answer to its problems. The first step necessary to meet the recent competition from privately owned wells in the E-65 area¹⁰ is to increase the percentage of diverted water which reaches the irrigated lands from 33 percent to about 60 percent.

As a consequence of the 67 percent loss in diverted water, groundwater levels have risen alarmingly. Near the Phelps canal, the rise has been as much as 90 feet in some places. The average increase since 1940 is 31 feet. Before Central began importing water, the groundwater basin bordered by the Platte and Republican Rivers showed a water level grid of almost constant southerly gradient between the rivers.¹¹ At the present time, however, the subterranean water feeds both rivers because the level has been raised high enough that the water now moves in both directions.

The E-65 Master Plan

The E-65 Master Plan, dated November 1971, was prepared by Cornell, Howland, Hayes & Merryfield—Clair A. Hill & Associates (CH₂M/Hill) of Redding, California, to increase efficiency. The E-65 canal with its headworks 63.3 canal miles downstream from the Platte River Diversion Dam is located in an area having 65,842 irrigable acres. Central has contracts to serve 33,700 acres but only about 17,000 are actually irrigated because

9. Address by Warren D. Fairchild, Assistant Commissioner of U.S. Bureau of Reclamation, Nat'l Conservation Education Conference in Lincoln, Neb., Aug. 21, 1972, at 8.

10. Dirmeyer, *Automation*, 6 CENT. NEB. IRRIGATOR 7 (No. 1, Summer 1969).

11. CH₂M/HILL, *supra* note 5, at 6-9.

farmers must sign up for at least 2 acres to receive enough water for a single acre. Another 17,330 acres are served by private wells, leaving 31,512 acres without a water supply. In addition, in the southern region, which is outside the watershed, there are 46,000 acres of which 12,000 are irrigated by about 470 private pumps. Thus, 34,000 acres are left un-irrigated. For a normal growing season, the average water requirement is 1.37 acre feet per acre.¹²

Since 1942 participating farmers have had contracts which are non-cancelable by Central but cancelable by the users on 3 years notice. The contract cost is \$2.50 an acre foot, or actually \$5 when 2 acres are signed up to irrigate 1. Users receive .18 of an acre foot of water per acre (about 2.2 inches) every 21 days which is inadequate for present day agricultural production methods.

Further, water releases into the canals are pre-set some time in advance and a farmer must take his allotted share on the scheduled day or lose it. If the water run arrives after several days of cloudbursts, his choice is to either let it go by or divert it to already soaked lands. Obviously the latter alternative is unacceptable. As a result, he pays but gets no water. Another problem which has already been mentioned is that bogging makes farming impossible in certain locations.

To solve these problems, a mathematical model using groundwater conditions from 1960 to 1970 was simulated by use of digital computers.¹³

12. *Id.* at 5-1.

13. *Id.* at 6-13. For a description of reservoir simulation by use of analog and digital computers, see P. EMERY, EFFECT OF GROUND-WATER PUMPING ON STREAMFLOW AND GROUND-WATER LEVELS, BLUE RIVER BASIN, NEB. (U.S. Geol. Survey Open-File Rep., Lincoln, Neb., May 1965); P. HUNTOON & W. VISSMAN, A DIGITAL MODEL OF THE UPPER BIG BLUE WATERSHED (Technical Rep. I, Conservation and Survey Div. & Neb. Water Resources Research Inst., U. of Neb., Aug. 1972); E. MOULDER & C. JENKINS, ANALOG-DIGITAL MODES OF STREAM-AQUIFER SYSTEMS 1, 6 (U.S. Geol. Survey Open-File Rep., Denver, Colo., March 1969); G. ROBINOVE, GROUND-WATER STUDIES AND ANALOG MODELS 6 (U.S. Geol. Survey Cir. 468, 1962); 49 STANDARD OIL CO. OF CAL. BULL. 14, 15 (Winter 1972); Theis, *The Effect of a Well on the Flow of a Nearby Stream*, 22 TRANSACTIONS AM. GEOPHYSICAL UNION 734-38 (1941); White, *A Perspective of River Basin Development*, 22 LAW AND CONTEMP. PROB. 157, 160 (1957). Cf. FRAMEWORK STUDY at 241-53, 267-68. Usually more data is needed. C. L. McGuinness wrote:

Ground-water studies cost money, and the more detailed the information needed, the higher the cost. Working with a "marginal" commodity such as water, one whose cost is low and is expected to continue to be low, it is not at all impossible that in a particular situation the cost of a study required to prove that ground water is the most economical source of water for a given use might raise the total cost.

C. MCGUINNESS, SCIENTIFIC OR RULE-OF-THUMB TECHNIQUES OF GROUND-WATER MANAGEMENT—WHICH WILL PREVAIL? 4-5 (U.S. Geol. Survey Cir. No. 608, 1969). McGuinness also points out that a "rule-of-thumb" is sufficient in most situations even though scientific answers are preferable. *Id.* Externalities re-emphasize the need for conjunctive use because integrated basin-wide planning is the best way to deal with these external variables. Kneese & Nobe, *The Role of*

(The general design of the resulting conjunctive use plan is shown on Master Plan Improvements Map on pages 282-83.) The plan calls for installation of 12 wells owned and operated by Central, a 28,000 acre foot pump storage facility and the lining of approximately 100 miles of laterals. Twenty-seven miles of main canal will be enlarged, 30 major structures replaced or enlarged and 28 checks automated.

There are three major objectives of the project improvement: To provide an adequate supply to deliver irrigation water on an "order" or "call" basis to meet modern irrigation requirements; to provide for groundwater stabilization; and finally, to develop areas for wildlife enhancement.

In order to meet these objectives, the following plan has been developed. By a selective system of canal lining, seepage will be minimized in places where water levels are rising excessively, and the necessity of enlarging canals at the lower end of E-65 will be eliminated. Project wells will pump 3,000 to 6,000 gpm of supplemental water into the system on an average of 66 days per year. This substitution of underground storage capacity for surface canals achieves one of the paramount goals of conjunctive use.

In addition to the wells controlled by Central, many private wells will continue in use, and Central has no design to stop them either by legal action or by trying to obtain new legislation. Nonetheless, by selective placement of canal linings, Central should be able to exert some control over private supplies. It is anticipated that at least some of the present pumpers will shut down and contract with Central for project water. Because of increasing maintenance and replacement problems, plus steadily rising costs for electricity, propane, diesel, and natural gas, farmers will find service from the district cheaper and more dependable in the long run. Although Central should have the authority to manage all water in the district in order to obtain optimum results from integrated use, it is practically impossible to condemn all small rights.¹⁴ Therefore farmers in the area must be encouraged to voluntarily give up their private wells. Hookups without cost and free water for a specified time may add an additional incentive for switching to project contracts. A guaranteed supply from Central would be less risky and probably much less expensive in the long run and, as stated by Deon Axthelm, University of Nebraska Extension Water Resources Specialist:

What difference would it make to a water user whether the source of water were from an above or below ground reservoir? If the ultimate objective of meeting the many and varied water uses with maximum efficiency is to be made, single control over the supplies appears to be a necessity.¹⁵

Economic Evaluation in Planning for Water Resource Development, 2 NAT. RES. J. 445, 454 (1962). Exogenous variables, or uncontrolled inputs, such as precipitation, streamflow and evapotranspiration also must be considered although they can vary immensely from year to year. See Howell & Johnston, *System Modelling for Conjunctive Use of a Groundwater Aquifer and a Surface Reservoir 154*, in PROCEEDINGS OF GROUNDWATER SYMPOSIUM, U. OF S. WALES WATER RESEARCH LABORATORY (Paper No. 10, Aug. 28-29, 1969).

14. See E. CLYDE & D. JENSEN, ADMINISTRATIVE ALLOCATION OF WATER 94 (Nat'l Water Comm'n Legal Study No. 3, July 1, 1971).
15. D. Axthelm, A New Concept in Basin Water Use 9 (paper prepared for Four-States Irrigation Council 17th Annual Conference at Denver, Colo., Jan. 1968).

In addition to managing groundwater levels and augmenting canal flows by operation of high capacity well fields, the E-65 Master Plan is to provide off-peak storage for the high requirements in July and August. (The 40,500 acre foot pump storage facility at the Elwood Reservoir and damsite are shown on the Master Plan Improvements Map on pages 282-83.) Development of this storage, together with Central's wells near service areas, will reduce the delivery time lag and make possible better, more efficient service.

Under the proposed plan an irrigator will be supplied with essentially all the water he can put to a beneficial use. It would be delivered on an "order" or "call" basis not to exceed .28 of an acre foot (about 3.36 inches) every 10 days which is the same as 7.06 inches every 21 days. This equals 3.5 times the present rate, at a yearly cost for the new service between \$7 and \$10.50 per irrigated acre.

Legal problems

When a district like Central imports water on a large scale and runs it through canals and ditches, great quantities percolate into the basin under the project and the rest either seeps laterally as return flow into water-courses or moves underground into adjoining aquifers. Central's water budget shows 20,616 acre feet added to ground storage in 1964 and 17,980 acre feet in 1968. To use this stored water and water held in surface reservoirs conjunctively, the controlling agency must be able to use the land below the surface for storage and have some control over the water stored there.¹⁶ This raises three questions. First, whether a district in Nebraska has the right to store water below lands owned by others. Second, if so, whether the overlying landowners can be restricted in their withdrawals. Third, when if ever are overlying owners harmed by storage under their properties?

A number of authorities who have considered these questions have concluded that a district can utilize underground reservoirs to store imported water without paying compensation to overlying owners.¹⁷ Under the old common law rule that "to whomever the soil belongs, he owns also to the sky and to the depths," such storage would have been forbidden.

16. Teerink, *Utilization of Both Ground and Surface Waters*, 60 J. AM. WATER WORKS ASS'N 809, 814 (1968).

17. CORKER at 184, n.40, III-288, V-322; Krieger & Banks, *Ground Water Basin Management*, 50 CALIF. L. REV. 56, 70 (1962). See also V. Cline, *Ground Water Management: Legal and Organizational Considerations* 7 (mimeographed paper prepared for Office of the Chief Counsel, Cal. Dep't of Water Resources, Oct. 28, 1971); Birdleough & Wilkins, *Legal Aspects of Conjunctive Use in California*, in CALIFORNIA WATER: A STUDY IN RESOURCE MANAGEMENT 263, 267-70 (D. Seckler ed. 1971); Comment, *Project Ground Water: Problems and Possible Solutions in Application of the Federal Reclamation Act to a Disputed Resource*, 44 WASH. L. REV. 259, 264 (1968).

The CAL. WATER CODE § 1242 (West 1971) provides in part: "The storing of water underground . . . constitutes a beneficial use of water if the water so stored is thereafter applied to the beneficial purposes for which the appropriation for storage was made." See also CAL. WATER CODE § 60230 (6) (West 1966) (underground storage by districts).

But the "ownership to the sky" portion gave way to the airplane, and the "depths" part will be discarded, if it has not already, by courts which understand the hydrologic and sociological aspects of groundwater and its management.¹⁸ In the leading decision concerning use of groundwater basins for storage, *Los Angeles v. Glendale*,¹⁹ the city of Los Angeles was allowed to both transport and store water in the aquifer under the San Fernando Valley.

The storage right is diminished to the extent overlying landowners can remove water from the reservoir. Regarding this conflict, Judge Traynor wrote:

Plaintiff [the City of Los Angeles] had a prior right to the use of the water brought to the San Fernando Valley. It did not abandon that right when it spread the water for the purpose of economical transportation and storage [in and through the San Fernando Valley aquifer].²⁰

Although a California statute²¹ was relied on in part,²² the case necessarily illustrates that a state can constitutionally regulate such use. On the other hand, New Mexico, without statutory guideposts, has held:

[W]hen waters, either artificial surface waters or natural surface waters reach established underground basins by percolation, seepage or otherwise, they become public [Thus] the statutory manner of acquiring rights thereto is exclusive.²³

The California approach is the most desirable,²⁴ but only a public district should be permitted to store and control water under the lands of others. In the case of Central, it has no intention of interfering with those who desire to pump from wells on their own lands, and as a practical matter overlying landowners would be damaged only if bogging occurred or water levels were drawn below their natural state. The latter possibility is remote, and in the past Central has voluntarily paid for all harm caused by bogging due to importation of water. No claims have been litigated since formation of the district.

The point is that pump irrigators are getting water without paying the charges required of those supplied by Central. Although the costs of pumping are a burden on the users, such expenditures do not contribute towards bringing water into the area. Thus the cost of making ground-

18. CORKER at V-323. See generally Krieger & Banks, *Ground Water Basin Management* 50 CALIF. L. REV. 56, 69-74 (1962).

19. 23 Cal. 2d 68, 142 P.2d 289 (1943).

20. *Id.* at 76, 142 P.2d at 294. The actual issue was the right of Los Angeles vis-à-vis the claims by Burbank; no claim of an overlying landowner was involved. The court did find, however, that Los Angeles owned all the water in the San Fernando Valley. Thus no commingling problems were litigated, i.e., determining the basis for a formula to estimate how much water would have been in the valley without any activity on the part of Los Angeles and how much was traceable to other causes.

21. CALIF. WATER CODE § 7075 (West 1971).

22. 23 Cal. 2d at 78, 142 P.2d at 295 (1943).

23. *State ex rel. Reynolds v. King*, 63 N.M. 425, 428, 321 P.2d 200, 201 (1958). See also *State ex rel. Reynolds v. Luna Irrigation Co.*, 80 N.M. 515, 458 P.2d 590 (1969).

24. CORKER at 184.

water easily available is imposed on others, namely, surface irrigators, users of hydro-electric power²⁵ or taxpayers generally. For this reason, many believe that a district should have the power to tax or make charges on all beneficiaries of the district's enterprise.²⁶ For instance, a fee could be instituted for supplying recharge water. Thereafter, water use between ground and surface irrigators could be encouraged or discouraged by price and fee level adjustments.²⁷

The last question, that of liability for loss of storage space as a result of prior use by another,²⁸ apparently has not arisen in Nebraska or elsewhere.²⁹ Professor Charles Corker has suggested that if such problems do arise the prior appropriation principle of first in time, first in right, should be applied to subterranean storage.³⁰ However, so long as overlying landowners can continue to pump with no restrictions except those imposed by the reasonable use doctrine, no problems are foreseeable.

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25. To the extent that groundwater pumpers are in this group, they contribute to the importation of water. Central, by selling its power wholesale at the power plants to the Nebraska Public Power System, leaves the transmission, distribution and retailing to others.
 26. A question not considered in this paper is the extent to which L.B. 626, 82d Neb. Leg. Sess. (1971), amending NEB. REV. STAT. §§ 70-629, -667 (Reissue 1971), affects the prohibitions against the assessing of benefits by public power and irrigation districts. NEB. REV. STAT. §§ 70-604, -630, -631 (Reissue 1971). See also L.B. 308, 83d Neb. Leg. Sess. (1973), which was withdrawn. Interest groups now plan to draft a comprehensive water replenishment bill for consideration by the 84th Leg. Sess. in 1974.
 27. D. Axthelm, A New Concept in Basin Water Use 7 (paper prepared for Four-States Irrigation Council 17th Annual Conference at Denver, Colo., Jan. 1968).
 28. See Krieger & Banks, *Ground Water Basin Management*, 50 CALIF. L. REV. 56, 72-73 (1962); CORKER at 184-85.
 29. CORKER at 185.
 30. *Id.*