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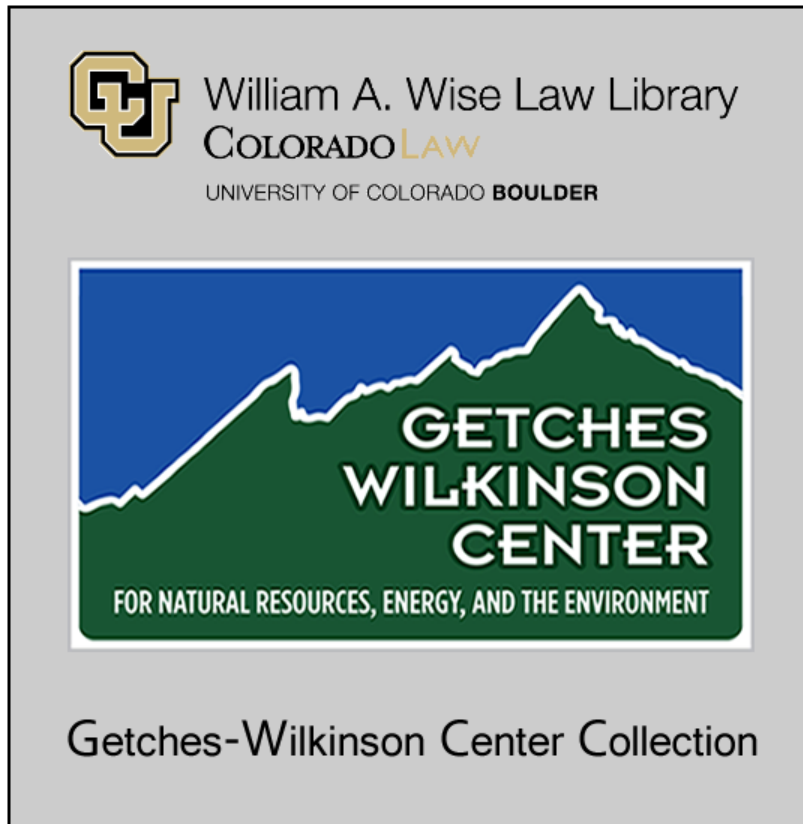


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LEGAL SYSTEMS FOR ALLOCATING GROUNDWATER
AND CONTROLLING ITS EXTRACTION

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GROUNDWATER:
ALLOCATION, DEVELOPMENT
AND POLLUTION

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I. INTRODUCTION

A. Groundwater Law and Technology: Relatively New Developments in Comparison with the Surface Water Resource

B. Research Sources

1. General authorities on water law.

a. 2 W. Hutchins, WATER RIGHTS IN THE NINETEEN WESTERN STATES 631-756 (U.S. Department of Agriculture, 1971-1977), relatively current, state-by-state analysis of water law.

b. 5 WATERS AND WATER RIGHTS 407-74 (R. Clark ed.) (A. Smith Co., 1967), comprehensive, multi-volume treatise on water law, now outdated in a few areas.

c. C. Meyers and A. Dan Tarlock, WATER RESOURCE MANAGEMENT 641-778 (2nd ed.) (Foundation Press, 1980), casebook on water law.

d. F. Trelease, WATER LAW 438-539 (3d ed.) (West Publishing Co., 1979), casebook on water law.

2. Groundwater allocation regimes and the economics of allocation.

- a. C. Corker, GROUNDWATER LAW, MANAGEMENT AND ADMINISTRATION (National Water Comm'n, Legal Study No. 6) (1971).
- b. Trelease, Conjunctive Use of Groundwater and Surface Water, 27B Rocky Mtn. Min. L. Inst. 1853 (1982).
- c. Clark and Arquedas, Developments in Groundwater Law, 57 Neb. L. Rev. 283 (1978).
- d. Governor's Commission to Review California Water Rights Law, Final Report 135-169 (1978).
- e. Aiken, Ground Water Mining Law and Policy, 53 U. Colo. L. Rev. 505 (1982).
- f. Loew, Ruedisili and Graham, Beyond Section 858: A Proposed Groundwater Liability and Mangement System for the Eastern U.S., 8 Ecol. L. Q. 131 (1979).
- g. Comment, Who Pays When the Well Runs Dry?, 37 U. Colo. L. Rev. 402 (1965).
- h. Friedman, The Economics of the Common Pool: Property Rights in Exhaustible Resources, 18 U.C.L.A. L. Rev. 855 (1971).

II. GROUNDWATER AND THE LAW: RESISTING THE HYDROLOGIC REALITY

- A. The Old Legal Fiction. The early cases often relied on the legal fiction of two different types of groundwater. See e.g., Howard v. Perrin, 8 Ariz. 347, 76 P. 460 (1904). One type is percolating groundwater; the other is water that flows in a defined subterranean watercourse. However this distinction does not reflect the hydrologic reality; hydrologically, groundwater can appropriately be classified as either tributary or non-tributary to surface water.
- B. Tributary groundwater is water that is in some way hydrologically connected to surface water, so that extraction of this groundwater source would have some impact upon surface flows.
- C. Non-tributary groundwater is water that is not hydrologically connected to any surface stream. This form of groundwater is in reality rare. One commentator asserts: "most engineers and geologists believe all water is tributary to some stream, in some quantity, at some future point in time." Comment, Reasonable Use of Percolating Groundwater, 13 Ariz. L. Rev. 490, 493 (1971).
- Thus, non-tributary groundwater generally refers to water with a minimal connection to surface streams. Withdrawing such water would not effect change in a surface stream, if at all, for a long time and perhaps

over a great distance. Typically, the recharge rate in this type of groundwater source is very slow and the water in the formation has accumulated over a very long time.

III. THE TRADITIONAL GROUNDWATER ALLOCATION DOCTRINES

A. Introduction

1. Attempts to establish successful legal regimes for groundwater allocation have been fraught with inequities and frustrations. Some courts have simply abdicated:

The secret, changeable and unknowable character of underground water in its operations is so diverse and uncertain that we cannot well subject it to the regulations of the law, nor build upon it a system of rules, as is done in the case of surface streams.

Perkins v. Kramer, 148 Mont. 355, 423 P.2d 587, 591 (1966), citing Ryan v. Quinlan, 45 Mont. 521, 532, 124 P 512, 515 (1912).

B. Absolute Ownership (The English Rule)

1. The rule of absolute ownership, also known as the English rule, was first formally announced in 1843 in Acton v. Blundell. In Acton, a groundwater irrigator sued a miner who dried up the irrigator's

supply. The court held for the miner on two bases. First, that he had a right to use his land, which he owned "from the heavens above to the center of the earth below." Second, the court said that the way of groundwater is "unknown and unknowable." This holding was judicially advantageous in that it terminated the difficult factual inquiry about what has happened, or is about to happen, down in the earth.

2. Under the rule of absolute ownership, a landowner is free to pump unlimited quantities of water, for any use, with no liability to neighbors. This rule of no-liability has been applied tenaciously, to the extent of protecting a malicious landowner whose sole intent in pumping was to injure an adjacent neighbor's groundwater supply. Huber v. Merkel, 117 Wis. 355, 94 N.W. 354 (1903), overruled, State v. Michels Pipeline Construction Co., 63 Wis. 2d, 278, 217 N.W. 2d 339 (1974). See also, Drinkwine v. State, 134 Vt. 127, 300 A. 2d 616 (1973).

C. The Rule of Reasonable Use (The American Rule)

1. The rule of reasonable use allows landowners a usufructory right to the percolating water beneath their land subject to a reasonable use on the land from which the water is extracted. See generally,

Higday v. Nickolaus, 469 S.W. 2d 859 (Mo. App. 1971).

2. "Reasonable use." This phrase relates to the "beneficial use" feature of appropriative law: "beneficial use is the basis, the measure and the limit of the water right." The original Restatement of Torts, § 860 defined "reasonable" in the context of riparian use. This context, however, is often inapt since most reasonable use states have rejected riparianism. Bristor v. Cheatham, 75 Ariz. 227, 255 P.2d 173, 175 (1953).
3. "On the land." The doctrine thus limits uses on non-overlying lands, uses on lands outside of the basin, and sales. Under the rule of reasonable use, water may be extracted and transported "off the land" so long as no neighbor can show resultant injury.
4. So long as the water is reasonably applied on their land, landowners may extract any amount of water, even if thereby injuring a neighbor.

D. Correlative Rights

1. This doctrine first appeared in Katz v. Walkinshaw, 141 Cal. 116, 70 P. 663, 74 P. 766 (1902).

2. Essentially, the doctrine limits the proprietary rights of overlying landowners by providing that when there is an inadequate groundwater supply for all users of the same underground source, they must prorate use in proportion to the relative percentage of land area they own over the underground source.
3. The California Supreme Court modified this in Pasadena v. Alhambra, 33 Cal.2d 908, 207 P.2d 17 (1949), where it held that the various users of the Raymond Basin had established mutually prescriptive rights as against each other and must share proportionately in a reduction of the amount to be pumped.
4. This rule of Pasadena v. Alhambra was then limited in Los Angeles v. San Fernando, 14 Cal.3d 199, 537 P.2d 1250 (1975), where the court held that a prescriptive right could not be asserted against a municipality; further, a prescriptive right cannot run against any nonmunicipal party unless that party had received adequate notice that a condition of overdraft existed.

E. The Restatement Rule

The Restatement of Torts (Second), § 858 (1979), provides as follows:

- (1) A proprietor of land or his grantee who withdraws ground water from the land and uses it for a beneficial purpose is not subject to liability for interference with the use of water by another, unless
- (a) the withdrawal of ground water unreasonably causes harm to a proprietor of neighboring land through lowering the water table or reducing artesian pressure,
 - (b) the withdrawal of ground water exceeds the proprietor's reasonable share of the annual supply or total store of ground water, or
 - (c) the withdrawal of the ground water has a direct and substantial effect upon a watercourse or lake and unreasonably causes harm to a person entitled to the use of its water.
- (2) The determination of liability under clauses (a), (b) and (c) of Subsection (1) is governed by the principles stated in §§ 850 to 857 [regarding riparian rights].

IV. MODERN LEGISLATIVE ALLOCATION SCHEMES

A. Permit Systems

1. Legislation is generally based on prior appropriation. The administrative machinery requiring permits is of great importance. Substantive prior appropriation law governing surface water, however, is sometimes difficult to apply to groundwater.
2. The substantive law of prior appropriation:

- a. "First in time, first in right." Priority contingent on first use is a major distinguishing feature.
 - b. The requirement of a diversion.
 - c. The requirement of beneficial use.
 - d. The prohibition against waste.
3. The principle of priority in time (closing headgates in inverse chronological order from most recent junior first to oldest senior last in times of shortage) is easy to apply to surface streams where shortage is relatively easy to ascertain. However, as a factual matter it is much more difficult to ascertain where there is a groundwater shortage.
 4. The issue in groundwater appropriation lawsuits is not a claim of priority to an absolute amount of water. Rather, the claim is the right to pump unfringed at a given pressure level. See Section V, below.
 5. Several codes deal with the difficult question of groundwater mining, i.e., when extractions exceed recharge. Idaho forbids any form of groundwater mining. I.C. § 42-237a(g). Baker v. Ore-Ida Foods, Inc., 95 Idaho 575, 513 P.2d 627 (1973).

Colorado and New Mexico both allow groundwater mining and acknowledge aquifer depletion is inevitable. In Colorado, in designated basins a rate of pumping is allowed that would result in a 40% depletion of the available groundwater over 25 years. C.R.S. 37-90-106. See Fundingsland v. Colorado Ground Water Comm'n. 171 Colo. 487, 468 P.2d 835 (1970) (administratively-developed three-mile test). In non-designated, non-tributary basins, aquifer longevity of 100 years is assumed. C.R.S. 37-92-137(4). New Mexico works on a 40 year life. N.M.S.A. 72-12A-8 (1978).

B. Market Demand Theory

1. When the implemented allocative scheme fails and shortage occurs, there are, broadly speaking, two basic "schools" used for providing relief. One is the enactment of legislation that proscribes certain uses and announces what rights attach. See § C, infra. The second school is reliance on the free market to solve the overdraft problem.
2. For example, the choice between these two schools confronted the Arizona legislature before it enacted the 1980 Arizona Groundwater Management Act.
3. Those favoring the market-demand theory argued that

since much agricultural land had already gone out of production because the cost of pumping water from increasing depths had made continued farming in those areas uneconomical, the combination of small profit margins and high pumping costs would result in termination of irrigation pumping long before aquifer depletion. Further, since most municipal and industrial users can afford to pump from deeper levels than can farmers, and since agriculture had been the largest water user in Arizona, it was argued that conservation would occur "naturally" from the operation of the free market.

4. Finally, market-demand theory advocates argued that cities could afford to purchase and retire agricultural land with developed water rights, so that the allegedly more valuable uses could expand without any additional aquifer depletion.
5. It is notable that in politically conservative Arizona this alternative was soundly rejected. See Kyl, The 1980 Arizona Groundwater Management Act: From Inception to Current Constitutional Challenge, 53 U. Colo. L. Rev. 471 (1982). See also Town of Chino Valley v. City of Prescott, 131 Ariz. 78, 638 P.2d 1324 (1981).

C. Critical Area Legislation

1. Critical area designation is, in part, an acknowledgment by a state legislature that, despite whatever other method of allocation is employed in the state, extraction is exceeding recharge at a dangerous rate -- thereby necessitating legislative intervention.
2. The legislation typically provides authority for the state engineer to designate an area (often a basin) "critical." Once so designated, no new wells may be installed in the area. However, those wells existing in the area at the time of the designation are typically protected, even if when used they exceed the recharge rate. For an eloquent attack on this approach see, Southwest Engineering Co. v. Ernst, 79 Ariz. 403, 291 P.2d 764 (1955) (Cameron, C.J. dissenting).
3. An example of critical groundwater area statutorily defined:

"Critical groundwater area" is defined as any groundwater basin, or designated part thereof, not having sufficient groundwater to provide a reasonably safe supply for irrigation of cultivated lands, or other uses in the basin at the then current rates of withdrawal, or rates of withdrawal projected by consideration of valid and outstanding applications and permits, as may be determined and designated, from time to time, by the state reclamation engineer.

Idaho Code § 42-233(a).

4. A recurring question here is whether the state engineer's evidence is sufficient to sustain a designation of a critical area. See, Tappen v. Smith, 92 Idaho 451, 444 P.2d 412 (1968).

D. Conjunctive Use

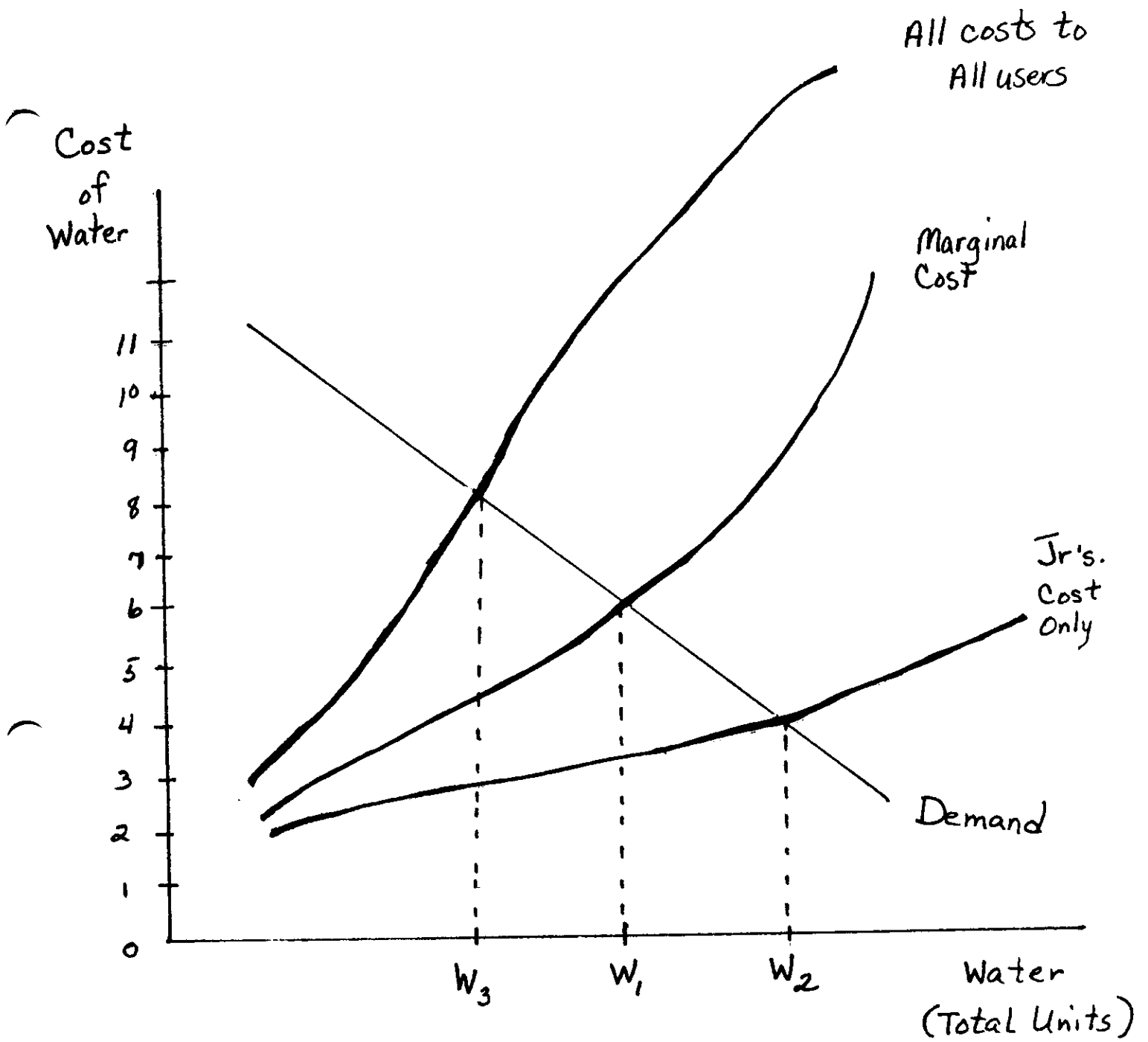
1. Conjunctive use defined: "[c]onjunctive use is the name applied to several different practices and processes employed to coordinate the use of ground and surface water in order to get the maximum economic benefits from both resources." Trelease, Conjunctive Use of Groundwater and Surface Water, 27B Rocky Mt. Min. L. Inst. 1853, 1854 (1982).
2. However, conjunctive use connotes different meanings in different regions. In California it has been referred to as the underground storage of surface water. In Colorado it has been referred to the legal integration and use of tributary water. See, Hillhouse, Integrating Ground and Surface Water Use In An Appropriation State, 20 Rocky Mt. Min. L. Inst. 691, 692 (1975).
3. In Colorado, "tributary groundwater" comes under the same system as surface waters. E.g., C.R.S. 37-92-102(a)(1); Matter of Arkansas River, 581 P.2d

293 (Colo. 1978); Cache LaPoudre Water Users Ass'n v. Glacier View Meadows, 191 Colo. 53, 550 P.2d 288 (1976) (example of plan of augmentation).

V. WELL-DEPTH LOWERING: THE ECONOMIC CONSIDERATIONS

A. Introduction

In economic terms, water is most efficiently allocated and the social welfare maximized when it is consumed to the point that demand equals marginal cost. The marginal cost of groundwater has two components. One is the internal component -- the cost borne by the pumper. The other is the external component -- the costs imposed on all other pumping units by this one unit's decision to pump (e.g. lowering the water table thereby necessitating well deepening). The demand curve is a function of the value of the marginal product -- and the value is the price of the water multiplied by the change in amount of water applied. See generally C. Meyers and A.D. Tarlock, WATER RESOURCE MANAGEMENT 679-89 (1979).



Optimality - W_1
 Pay own costs - W_2
 Junior Liable - W_3

B. Pay Own Costs

One solution to the problem created by a declining watertable is the rule advocated by the junior appropriator in Current Creek Irr. Co. v. Andrews, 9 Utah 2d 324, 344 P.2d 528 (1959), that each well user pays his or her own costs. External costs are ignored.

C. The Junior Liable Rule

Here, when the junior appropriator causes the water table to fall, the junior is required to pay not only his or her own expenses but the increased costs to the other pumpers caused by the decline in the water table.

This rule, essentially adopted by the Current Creek court, has been criticized for over-burdening the junior appropriator with all external costs when the decline in the water table is a result of the junior's additional pumping and the established senior's continued pumping. Were the seniors not to pump when the junior began, the junior would not have to pump from the lower depth.

D. The Rule of Proportionality

An alternative to arbitrary assigning all external costs to the last junior pumper is the rule of porportionality. Here each pumper would pay a part of the external marginal costs in proportion to the

quantities pumped.

Friedman, The Economics of the Common Pool: Property Rights in Exhaustible Resources, 18 U.C.L.A. L. Rev. 855 (1971), argues that to achieve an optimal production rate, the bias toward early production must be eliminated. This can be achieved through the imposition of reciprocal externalities by one pumper on another and assigned "in some manner proportional to every owner's allotted share of the total volume of the pool, not the total volume produced in any one time period. . . .The formula envisions compensatory payments from producers of earlier units to producers of later units." Id. at 877. Although this theory may come close to pure optimality, its implementation would likely be administratively complex and expensive.

VI. WELL-DEPTH LOWERING: SOME ILLUSTRATIVE CASES

- A. Colorado Springs v. Bender, 148 Colo. 458, 366 P.2d 552 (1961). The rule of Bender is that a senior's groundwater diversion must be reasonable so that the senior "is not entitled to command the whole or a substantial flow of the stream merely to facilitate his taking the fraction of the whole to which he is entitled. . . .[P]riority of appropriation does not give a right to an inefficient means of diversion"

- B. Maerz v. U.S. Steel Co., 116 Mich. App. 710, 323 N.W.2d 524 (1982).

Plaintiff homeowners sued defendant quarry for lowering the water level in a well that was plaintiffs' exclusive source of water. The defendant argued that Michigan recognized reasonable use for waters extracted and used "off" the land and also recognized the English (absolute ownership) rule for waters extracted and used "on" the land. Since the water extracted from the quarry was used at the quarry, defendants argued they had an absolute right to extract at any rate they desired. The court rejected this argument, holding that extraction of underground water for a purpose connected with the land from which it is withdrawn is not per se unactionable. The Restatement (Second) rule was adopted.

- C. Wiggins v. Brazil Coal and Clay Corp., ____ Ind. App. ____, 440 N.E.2d 495 (1982).

Plaintiff lake front property owners sued for damages and to enjoin defendant mining company from pumping groundwater out of its mining pits. The defendant's pumping damaged plaintiffs by lowering the level of the lake. The court followed the recommendations of the Restatement of Torts (Second) § 858 in determining what is "reasonable." The court, prompted by the demands of equity, departed from stare decisis and the traditional common law rules, and held for the plaintiffs. Since

the defendant was a mine operation, the court reasoned: "we have no doubt that it is necessary for [defendant] to dewater its pits in order to mine coal. However, a principle of modern law is that a business should bear its own costs, burdens, and expenses of its operation because they can be distributed to the consumer through the price mechanism." 440 N.E.2d at 501. Thus the court departed from long established law to impose costs on neighboring landowners who extract groundwater depending on the nature of the landowner.

D. Prather v. Eisenmann, 200 Neb. 1, 261 N.W.2d 766 (1978).

Plaintiffs, domestic well-users, sued neighbor defendants, who extracted groundwater for irrigation. The court relied upon a user-preference statute giving first priority to domestic users, then agricultural users, then manufacturing and industrial users. The defendant irrigators were required to pay plaintiffs' increased pumping costs. The court found no preference or priority between domestic users: "[e]very overlying owner has an equal right to a fair share of the underground water for domestic purposes. If [well water levels are] lowered by other domestic users, plaintiffs would still be entitled to no relief so long as they still could obtain water by deepening their wells." The court left open the question of who pays if an aquifer is mined.

E. Baker v. Ore-Ida Foods, Inc., 95 Idaho 575, 513 P.2d 627
(1973)

Although this case is generally recognized for its holding enunciating the Idaho "no groundwater mining" rule, it also held that a senior appropriator who is aggrieved by a junior's pumping must have reasonable groundwater pumping levels and is not entitled to his or her historic diversion level. Moreover, the court held that implicit in the legislative delegation to the Idaho Department of Water Administration of the function of ascertaining reasonable pumping levels is the recognition that such levels may be modified to conform to changing circumstances. On the other hand, the court recognized that senior appropriators may enjoin pumping by juniors where additional pumping of juniors' wells will exceed the reasonable, anticipated average rate of future recharge, or where such pumping will force seniors to go below reasonable pumping levels as set by the state water department.

VII. CONCLUSION