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The Changing Meaning of Water Conservation in the West

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The Changing Meaning of Water Conservation in the West

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I. INTRODUCTION

The major importance of irrigation in many areas of the West lies in promoting stability and flexibility in production rather than in adding to the quantity of goods produced.¹

As water is increasingly perceived as a scare resource, demands to conserve it escalate.² On one level, there is nothing new in calls for

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1. R. HUFFMAN, IRRIGATION DEVELOPMENT AND PUBLIC WATER POLICY 128 (1953).
2. "The future of western water use lies in conservation, improved efficiency and reallocation of supplies." M. ASHRY & D. GIBBONS, TROUBLED WATERS: NEW

water conservation, but on another these calls may reflect a fundamental shift in historic water allocation patterns. Conservation has been the lodestar of American natural resources policy since the triumph of the progressive conservationists in the administration of Theodore Roosevelt.³ Conservation, however, is not self-defining, especially with respect to water. In fact, the concept encompasses sharply conflicting water allocation policies. The concept of water conservation dating from the Middle Ages originally meant protection of rivers from harm,⁴ but the modern meaning of better *use* stems from the conservation movement.

Progressive conservationism developed as a reaction to the unrestrained exploitation of natural resources⁵ that characterized the settlement of this nation from the Atlantic⁶ to the Pacific coasts.⁷ Because conservationists had so much to react against, they were able to define the term "conservation" abstractly enough to include the inconsistent ideas of preservation and planned development.⁸ Progressive conservationism was couched in scientific terms, but it was primarily a moral response to the perceived problems of greed and

POLICIES FOR MANAGING WATER IN THE AMERICAN WEST (1986). See, e.g., D. FRANCKO & R. WETZEL, *TO QUENCH OUR THIRST: THE PRESENT AND FUTURE STATUS OF FRESHWATER RESOURCES OF THE UNITED STATES* 1-3 (1983); see generally OFFICE OF TECHNOLOGY ASSESSMENT, *WATER-RELATED TECHNOLOGIES FOR SUSTAINABLE AGRICULTURE IN U.S. ARID/SEMIARID LANDS* (1983).

3. "The period between 1898, when Pinchot took charge of the Division of Forestry, and 1910, when he was dismissed from his position as head of the Forest service, constitutes the Golden Era of American Conservation history The basic contours of resource management policy in the twentieth century were first embraced by Roosevelt and his conservationist associates." S. DANA & S. FAIRFAX, *FOREST AND RANGE POLICY* 69-70 (2d ed. 1980).
4. D. WORSTER, *RIVERS OF EMPIRE: WATER, ARIDITY, AND THE GROWTH OF THE AMERICAN WEST* 154-55 (1985).
5. J. PENICK, *PROGRESSIVE POLITICS AND CONSERVATION: THE BALLINGER-PINCHOT AFFAIR* 5-6 (1968).
6. For a superb account of the way in which the social and legal institutions of the New England colonists shaped their perception of the landscape and led inevitably to its exploitation, see W. CRONON, *CHANGES IN THE LAND: INDIANS, COLONISTS, AND THE ECOLOGY OF NEW ENGLAND* (1983).
7. See J. PETULLA, *AMERICAN ENVIRONMENTAL HISTORY: THE EXPLOITATION AND CONSERVATION OF NATURAL RESOURCES* 172-91 (1977), for an account of post-Civil War economic development and the demand for the rapid exploitation of natural resources.
8. "Conservationists" and "preservationists" were originally united in the necessity for government retention of large amounts of public domain. By 1910, however, two distinct camps had emerged in the public resource management movement. The successful application of San Francisco for a permit to construct a reservoir in the Hetch Hetchy Valley of Yosemite National Park and the Senate's refusal to protect the valley was the first major conservation—preservation battle to attract widespread public attention. Preservationists led by John Muir lost the fight, but eventually became a significant and lasting political force in public land legislation. See R. NASH, *WILDERNESS AND THE AMERICAN MIND* 161-81 (3d ed. 1982).

concentration of private power. Wise resource use should be "determined by economic, social, aesthetic and moral considerations."⁹

Progressive conservation as an abstract ideal no longer commands the consensus that it once did because we have lost faith in the ability of non-political, scientific elites to formulate the right allocative policies,¹⁰ and because the era of the federal government as the primary water resources developer is ending. Today, "conservation" lacks a single operative meaning, even at a high level of abstraction. It can no longer function, as it did until the 1970s, to describe any resource policy from the construction of a multiple-purpose dam to the preservation of a scenic river.¹¹ In this century "conservation" has generally been defined either as maximizing the use of water by augmenting the supply or as an efficient engineering method of using less water to achieve an objective.¹² These two classic meanings of conservation of water resources are being challenged by welfare economists and environmentalists who argue that we must redefine the concept to mean economic, not merely technical, efficiency.¹³ Environmentalists, for example, no longer agree with the conservationist notion of wise use because "[c]onservation meant, to a great extent, the pursuit of technological dominance."¹⁴

The operative definition of conservation is important because it is the subject of intense debate in the West. The agendas of environmentalists and welfare economists converge and diverge and both may be at odds with the interests of the traditional water use community. For environmentalists, forcing the more efficient allocation of water is part of a grand strategy to bring about a better balance between the functioning of natural ecosystems and human activities through both water markets and regulation.¹⁵ Welfare economists and those influ-

9. S. DANA & S. FAIRFAX, *supra* note 3, at 72.

10. See R. NELSON, *THE MAKING OF FEDERAL COAL POLICY* (1983). The seminal article on the intellectual demise of the conservation movement is McConnell, *The Conservation Movement—Past and Present*, in *READINGS IN RESOURCE MANAGEMENT AND CONSERVATION* 189 (I. Burton & R. Kates eds. 1965).

11. "Soon after his inauguration as an elected President, Johnson outlined his 'new conservation' policy, calling for a White House Conference on Natural Beauty. . . . Johnson praised the conservationists achievements of the 88th Congress, which he . . . defined to include both preservationist and economic development programs." B. HOLMES, *HISTORY OF FEDERAL WATER RESOURCES PROGRAMS AND POLICIES, 1961-70*, at 96 (U.S. Dept. of Agric. Misc. Pub. No. 1379, 1979).

12. Willey, *Least Cost-Approaches for Satisfying Water Demand: An Alternative Analysis*, in *WESTERN WATER: EXPANDING USES/FINITE SUPPLIES* (Seventh Annual Summer Program, Natural Resources Law Center, Univ. of Colo. School of Law, June 2-4, 1986, Boulder, Colo., Loose Leaf, 1986) (hereinafter *WESTERN WATER: EXPANDING USES/FINITE SUPPLIES*).

13. Z. WILLEY, *ECONOMIC DEVELOPMENT AND ENVIRONMENTAL QUALITY IN CALIFORNIA'S WATER SYSTEM 2* (1985).

14. D. WORSTER, *supra* note 4, at 155.

15. See Z. WILLEY, *supra* note 13.

enced by economic analysis regard privatization of resource use as the primary goal. Preservation of ecosystem balance is a secondary benefit of privatization policies.

Debates about the meaning of "conservation" are central to the future allocation of western waters.¹⁶ In the western United States, the major consumptive use of water is for irrigated agriculture. This use has always been economically irrational in most places.¹⁷ The Mormons initially revived the southwestern Indian practice of crop irrigation to survive in the Great Salt Lake Valley, but the modern system of irrigated agriculture was put into place after the western frontier was closed.¹⁸ Proponents of irrigation justified it "not only as a means of economic development but also as the driving wheel for social and spiritual progress."¹⁹ Irrigation was one of the last gasps of nineteenth century utopian movements, and irrigated agriculture survived in the West only because of twin federal subsidies: the construction of reclamation projects and crop price supports.²⁰

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16. The issue is not unique to water law. In other areas of natural resources law, traditional meanings of "conservation" are being reexamined and redefined. See, e.g., *Copper Valley Machine Works, Inc. v. Andrus*, 653 F.2d 595 (D.C. Cir. 1981) (condition in federal Alaska oil and gas lease restricting drilling for environmental reasons was a suspension for "conservation" reasons).
 17. This is the lesson of a classic National Academy of Sciences report. NATIONAL ACADEMY OF SCIENCES, PUB. NO. 1689, *WATER AND CHOICE IN THE COLORADO RIVER BASIN: AN EXAMPLE OF ALTERNATIVES IN WATER MANAGEMENT* (1968). The report was preceded by a decade or more of criticism of federal reclamation and water resources development expenditures. Leading studies include O. ECKSTEIN, *WATER RESOURCES DEVELOPMENT* (1958) and M. KELSO, W. MARTIN & L. MACK, *WATER SUPPLIES AND ECONOMIC GROWTH IN AN ARID ENVIRONMENT* (1973). See also D. WORSTER, *supra* note 4, at 169-88, for an extended argument that the federal reclamation program was a failure in the Inter-Mountain West.
 18. Irrigation was somewhat forced on a reluctant West after the dominance of the cattle and other dry ranching industries ended. See Freyfogle, *Lux v. Haggin and the Common Law Burdens of Modern Water Law*, 57 U. COLO. L. REV. 485, 488-89 (1986). The flavor of irrigation proponents is captured in 1 C. KINNEY, *A TREATISE IN THE LAW OF IRRIGATION AND WATER RIGHTS AND THE ARID REGION DOCTRINE OF PRIOR APPROPRIATION* (2d ed. 1912). In Elwood Mead's famous 1901 report on the potential for irrigation in California, he observed, "until quite recent years the people living in the greater part of the State regarded irrigation in the same light that eastern people generally view it, viz., that it is a grievous hardship imposed by nature upon the inhabitants of certain ill-favored regions of the earth." OFFICE OF EXPERIMENT STATIONS, U.S. DEPT. OF AGRIC., *REPORT OF THE IRRIGATION INVESTIGATIONS IN CALIFORNIA*, BULLETIN 100, at 346 (1901).
 19. W. KAHRL, *WATER AND POWER: THE CONFLICT OVER LOS ANGELES' WATER SUPPLY IN THE OWENS VALLEY* 30 (1982). William E. Symthe, who was the first executive secretary of the National Irrigation Congress, predicted in 1900 that Southern California had reached its natural limit of settlement and that "this charming district is not within the field of the largest future developments" which he predicted would occur on the eastern slope of the Sierra Nevada mountains. *Id.* at 26.
 20. See R. LOWITT, *THE NEW DEAL AND THE WEST* 91-96 (1984), for an analysis of the relationship between reclamation projects and crop subsidies.

Today, there are strong fiscal and other pressures throughout the West to modify existing use practices to reallocate water from agriculture to municipal and industrial uses in order to promote economic efficiency.²¹ The major thrust of the most comprehensive and influential assessment of water allocation policies, the National Water Commission's study, is captured in the Commission's discussion of the value of water:

The comparison of water values in alternative uses will become increasingly important in the years ahead, as growing demands compete for limited natural supplies and values in use increase. The opportunities for net gains by better allocations will be much greater. Not only will efficiency in the design of facilities be important, but also efficiency in allocation of water itself. Economic values provide the best general indication of the basic worth of water if appropriate attention is given to protection of environmental values.²²

The National Water Commission basically equated the conservation of water resources with the efficient allocation of water²³ as determined by the free market corrected for external costs. This reflects a growing consensus among the major players in the water allocation game. Continued urbanization and industrialization of the region, coupled with the end of federal reclamation subsidies as the West once knew them, have bolstered the argument that economic efficiency should be the exclusive definition of conservation. If water conservation becomes equated with economic efficiency, a fundamental revolution in western water allocation and law may result.²⁴ This revolution will not come easily; the concept of conservation of water

21.

In today's environment of discouragement and delay in constructing new water development projects our interests must turn to looking into any and all opportunities to stretch our existing sources to meet increasing water needs. The more feasible and cost effective projects have already been developed in most areas of the West.

Stetson, *Opportunities For Improving The Ways We Use Water*, in WESTERN WATER: EXPANDING USES/FINITE SUPPLIES, supra note 12.

22. NATIONAL WATER COMMISSION, WATER POLICIES FOR THE FUTURE, 47 (1973). An earlier study of water use in the two fastest growing regions of New Mexico, THE VALUE OF WATER IN ALTERNATIVE USES (N. Wollman ed. 1962), recommended a shift from agricultural uses to municipal and industrial, and fish and wildlife uses. Some expansion of existing irrigated acreage was supported, however, to preserve New Mexico's priorities on interstate streams.
23. This Article adopts the standard definition of efficiency used by welfare economists. Water resources are efficiently allocated "when no mutually advantageous exchanges are possible between any pair of claimants, which can only mean that each claimant values his last or marginal unit of water equally with the others, measured in terms of the quantity of other resources (or dollars) that he is willing to trade for an additional unit of water." J. HIRSHLEIFER, J. DE HAVEN & J. MILLMAN, WATER SUPPLY: ECONOMICS, TECHNOLOGY, AND POLICY 38 (1960). See also Ciriacy-Wantrup, *Water Economics: Relations to Law and Policy* in 1 WATERS AND WATER RIGHTS 397 (R.E. Clark ed. 1967).
24. See generally K. FREDERICK (with J. HANSON), WATER FOR WESTERN AGRICULTURE (1982).

has a history that contains powerful counter-pressures to this unitary definition of conservation as allocative efficiency.

There are still powerful forces that identify conservation with enhanced use opportunities through technological efficiency in water application, principally in the name of regional, tribal or some other equity.²⁵ In the West, technological efficiency has primarily meant subsidies, so this definition of conservation is at odds with economic efficiency. For example, technical water saving practices may make more water available for inefficient uses.²⁶ In some situations, of course, the enhancement of technological efficiency will also enhance the efficient allocation of the resource.²⁷

These potentially inconsistent concepts of conservation reflect a strong sentiment, rooted deeply in the history of the settlement of the West and hence in water allocation law and policy, that distributional fairness or "equity" should be preferred to any definition of efficiency.²⁸ Despite pious condemnations of waste and statements by major water users that water should always be put to its highest and best use, water has seldom been allocated efficiently in either the technical or economic sense.²⁹ And, this is not by chance. There are powerful forces, both political and legal, that refuse to equate conservation with efficiency, and history is on their side.³⁰

An ironic but revealing example of the resistance to the teachings of resource economics occurred at an October 1985 Western Governors' Association Water Efficiency Workshop.³¹ The case for strict

25. The best defense of the argument that water ought not to be allocated "simply as an economic commodity," but should be allocated by principles of equity is Ingram, Scaff & Silko, *Replac ing Confusion With Equity: Alternatives For Water Policy in the Colorado River Basin*, in *NEW COURSES FOR THE COLORADO RIVER: MAJOR ISSUES FOR THE NEXT CENTURY* 177 (C. Weatherford & F. Brown eds. 1968). Equity is defined as reciprocity, value-pluralism, participation, promises and responsibility to further the claims of less politically powerful users, primarily Indian tribes.

26. See, e.g., *WATER AND AGRICULTURE IN THE WESTERN U.S.* 85 (C. Weatherford ed. 1982).

27. See Dunning, *The "Physical" Solution in Western Water Law*, 57 U. COLO. L. REV. 445 (1986).

28. This is the now classic "water is different" syndrome. See Kelso, *The Water is Different Syndrome or What is Wrong with the Water Industry*, in *PROCEEDINGS OF THE THIRD ANNUAL CONFERENCE OF THE AMERICAN WATER WORKS ASSOCIATION* 176 (1967).

29. Comparing "water duty" in India and the United States, D. WORSTER, *supra* note 4, at 149, writes that "only in a few areas in southern California did the Americans match . . . [India's] efficiency. The difference was due in no small part to better distribution and more careful management in Punjab and Uttar Pradesh."

30. Wilkinson, *Western Water Law in Transition*, 56 U. COLO. L. REV. 317, 325 (1985).

31. The results of the workshop and related surveys of attitudes toward conservation are reported in Driver, *Policies To Enhance Western Water Use Efficiency: Best of the West*, in *WESTERN WATER: EXPANDING USES/FINITE SUPPLIES*, *supra* note

neo-classical definitions of efficiency was pushed by environmentalists.³² But, in a reversal of roles, representatives of existing agricultural, rural and urban users adopted the rhetoric of the Native American Rights movement and argued that the benefits of existing stream flows for riparian habitats and the preservation of indigenous cultures should not be sacrificed to the market!³³

This Article on the meaning of conservation, offered in honor of the retirement of Professor Richard Harnsberger of the University of Nebraska College of Law, traces the changing meaning of the term from the rise of irrigation through the conservation era to the present and examines the way in which western water law both complements and frustrates efforts to equate conservation with allocative efficiency. Professor Harnsberger is a nationally recognized water law scholar. Conservation is a fitting subject for an Article honoring this respected scholar. His work on the condemnation of water rights is definitive,³⁴ and much of his scholarship has concerned the necessity to conserve Nebraska's most valuable and over-used water resource, groundwater.³⁵

Part I of this Article examines the law of prior appropriation that developed before what we now refer to as the "conservation era." The thesis of Part I is that the law of prior appropriation has always subordinated efficiency principles to distributional ones, and that this nineteenth century legacy still makes it difficult to incorporate efficiency principles into the law. Part II of the Article explores the dif-

12. The governors' final statement endorsed the enhancement of water use efficiency, but stressed protection of "the well-being of those affected by the change as well as public values of water use." WESTERN GOVERNORS' ASSOCIATION RESOLUTION 86-___, July 8, 1986. The final report, B. DRIVER, WESTERN WATER: TUNING THE SYSTEM (1986) (report to the Western Governors' Association from the Water Efficiency Task Force), stresses the need to improve the efficiency of water allocation through conservation and markets, but the report is tempered by the need to consider the impact of efficiency on "third party holders of water rights and on public environmental and community values in water . . ." *Id.* at 16.

32. For a strong argument that environmentalists and fiscal conservatives have a substantial common interest in forcing the reallocating of existing supplies, see T. ANDERSON, WATER CRISIS: ENDING THE POLICY DROUGHT (1983).

33. A recent survey of water marketing found that "[e]lected officials in many farm areas contend that selling water could be devastating to their communities. Farmers hoping to get started, they say, could not afford to pay market rates for water, while business and professional people who depend on a strong farm economy would suffer . . ." The New York Times, May 12, 1986, at B12, col. 4.

34. Harnsberger, *Eminent Domain and Water Law*, 48 NEB. L. REV.325 (1969). The article is also published as a Chapter in 4 WATERS AND WATER RIGHTS 1 (R.E. Clark ed. 1970).

35. Professor Harnsberger's first major water law article after his thesis was *Nebraska Ground Water Problems*, 42 NEB. L. REV. 721 (1962). Harnsberger, Oeltjen & Fischer, *Groundwater: From Windmills to Comprehensive Public Management*, 52 NEB. L. REV.179 (1973), remains a model study of the problems of implementing an effective groundwater conservation strategy.

ferent meanings of water conservation from the progressive era to the present and contrasts these meanings with the concepts of resource conservation and allocation efficiency used by welfare economists. The purpose of this exercise is to show that historically the conservation of water resources has been equated with storage and distribution projects rather than with the principle of equating marginal uses urged by welfare economists. Now, however, the welfare economists' historic criticisms of water resources allocation are coming to control, over vigorous dissent, the debate about the future of western waters. Part III examines existing conservation scenarios, with emphasis on efforts to reallocate water through water markets, and discusses changes in the doctrine of prior appropriation that can facilitate the operation of water markets.

II. PRIOR APPROPRIATION: INEFFICIENCY IN NAME OF FAIR DISTRIBUTION

Beneficial use is coming to be called "conservation" of the water.³⁶

Western water law is designed to allow as many people to use as much water as possible and it therefore creates more disincentives than incentives to conserve water. Prior appropriation originated with the practices of the gold miners on the public domain in California and was eventually adopted as the law of surface allocation in the West in order to accommodate the objective of western settlement within the ecological imperative of aridity.³⁷ Prior appropriation was justified on the theory that the adoption of the common law of riparian rights would have nullified the distributive objectives of the homestead laws by confining the productive lands to entries along a stream.³⁸ This is, for example, exactly what happened in the southern San Joaquin valley of California, as a result of the state supreme court's adoption of the common law.³⁹ Prior appropriation promoted widespread access to land by promoting widespread access to water. Thus, from the

36. 1 S. WIEL, *WATER RIGHTS IN THE WESTERN UNITED STATES* 504 (3d ed. 1911).

37. See W. WEBB, *THE GREAT PLAINS* (1931). There is little doubt about the contribution of the miners to the development of western water law. Doubt has been expressed whether the doctrine was created out of whole cloth; the right to use water for mining has been traced to English and German mining codes. 1 W. HUTCHINS, *WATER RIGHTS IN THE NINETEEN WESTERN STATES* 165 (1971). Pre-historic indian practices in Arizona and New Mexico, Spanish law and Mormon irrigation practices have also been cited as sources of the concept of prior appropriation, although the evidence is weak. See *id.* at 160-63.

38. 1 S. WIEL, *supra* note 36, at 128.

39. *Lux v. Haggin*, 69 Cal. 255, 10 P. 674 (1886). For a review of attempts to evaluate the effects of land concentration in the Southern San Joaquin Valley, see Goodall & Sullivan, *Water System Entities in California; Social and Environmental Effects in SPECIAL WATER DISTRICTS: CHALLENGE FOR THE FUTURE* 71 (J. Corbridge ed. 1984). See generally FREYFOGLE, *supra* note 18.

start, efficiency was subordinated to distribution. This legacy is still with us, and the subordination of efficiency to distribution was reenforced by the politics of irrigation.

Because of its mining origins, the doctrine of prior appropriation is customarily characterized as one of extreme individual use compared to the common law doctrine of riparian rights. Men have killed over water,⁴⁰ but the practice of water distribution and use under the doctrine of prior appropriation displays much more cooperation and sharing than is often acknowledged. Prior appropriation practice as we know it today owes much to the irrigation colony experiments in Colorado and southern California.⁴¹ Irrigation on any scale requires cooperation and some assurance that all members of the community of irrigators will have access to the water at crucial times of the year. Riparianism defines the community of users as those within the watershed of a stream. Prior appropriation does not restrict the locus of use, but where irrigation has developed along a stream system, the law has recognized the benefits of preserving an existing community of users closely tied to a watershed. It is relatively easy to acquire a water right, but it is difficult to transfer one apart from a sale of the land.⁴²

Western water law has historically sought to further two inconsistent objectives and has thus both promoted and frustrated efficiency. The first objective was to create private rights in what is naturally a shared or community resource. The second was to promote widespread access to the resource. The rejection of riparianism by western states and their adoption of the law of prior appropriation set the ground rules for the private capture of what were once public resources. This accomplished the first objective. Colorado's rejection of the common law as unsuited to the arid West is also seen as accomplishing the second because it was directed to the prevention of "water monopolies," a subject of intense concern in the nineteenth century west, although both the common law and prior appropriation rules

40. "The evidence shows that the owners exhausted every legitimate means within their power to get this water down the river. . . . [T]he county officials placed numerous patrolmen on the river, but they were unable to keep the gates above closed down. . . . In some instances the deputies were thrown into the river, in others they were fired upon . . ." *Ironstone Ditch Co. v. Ashenfelter*, 57 Colo. 31, 36-37, 140 P. 177, 179 (1914). "One story goes that the first murder committed after Montana received statehood took place on the Burnt Fork Creek in the Bitterroot Valley as two irrigators 'discussed' their rights at the headgate." O'Keefe, *Water Reservation History, Status and Alternatives* in MONTANA ENVIRONMENTAL QUALITY COUNCIL, ANNUAL REPORT: MONTANA'S WATER 62-63 (1985).

41. R. DUNBAR, *FORGING NEW RIGHTS IN WESTERN WATERS* 9-35 (1983).

42. J. Wescoat, *Integrated Water Development: Water Use and Conservation Practice in Western Colorado 109-25* (University of Chicago Dept. of Geography Research Paper No. 210 (1984)).

have been defended as anti-monopoly rules.⁴³ To prevent monopolization, the large-scale concentration of land and water rights had to be curbed. The common law of waste provided some precedent for restraining the use of private property in order to protect the correlative rights of other owners, but additional restraints were necessary to ensure that the water was uniformly applied to productive uses.⁴⁴ Anti-monopoly policies were initially implemented through doctrines that, to prevent "speculation,"⁴⁵ required that claimed water rights be put to use within a reasonable time after the claim.

Still, the early law of prior appropriation encouraged excessive claims and further restrictions on use had to be developed. To curb excessive paper claims that could chill or foreclose future development, courts adopted the beneficial use requirement as a possible means of redistributing available supplies from early to later users.⁴⁶ Limiting water rights to the amount of water actually applied to a beneficial use has been at best an experiment with limited success. In order to promote regional irrigation economies, it became necessary to allow, even encourage, wasteful practices to support a large demand on any stream system. In the end, community sharing, rather than the efficient allocation of water resources, became the primary objective both of users and of water law.⁴⁷

Community sharing, however cutthroat, is best illustrated by the rule that the transfer of a senior right cannot injure the rights of downstream juniors to return flows. This solicitude for junior rights can be defended as an efficient rule because it forces the internalization of external costs.⁴⁸ But, this begs the question because there is no *a fortiori* reason why return flows should be part of a junior right.⁴⁹ In the welfare economics literature, the existence of an external cost

43. S. WIEL, *supra* note 36, at 128-29, thought that in settled communities and along small streams prior appropriation would lead to monopoly, but that riparian rights, provided the reasonable use rule was adopted, would curb it.

44. R. DUNBAR, *supra* note 41, at 71-72.

45. S. WIEL, *supra* note 36, at 398-99, 425. Anti-speculative doctrines abound in natural resources law, but they have been forcefully criticized because they promote premature, inefficient development. See Williams, *The Requirement of Beneficial Use as a Cause of Waste in Water Resource Development*, 23 NAT. RESOURCES J. 7 (1983).

46. Kinney titled his chapter on beneficial use "Economical Use and Suppression of Waste." 2 C. KINNEY, A TREATISE ON THE LAW OF IRRIGATION AND WATER RIGHTS AND THE ARID REGION DOCTRINE OF APPROPRIATION OF WATER, aaaa 874-916 (2d 1912).

47. For a full, empirical development of this thesis, see A. MAASS & R. ANDERSON, AND THE DESERT SHALL REJOICE: CONFLICT, GROWTH AND JUSTICE IN ARID ENVIRONMENTS (1978).

48. C. MEYERS & R. POSNER, MARKET TRANSFER OF WATER RIGHTS: TOWARD AN IMPROVED MARKET IN WATER RESOURCES, NATIONAL WATER COMMISSION, LEGAL STUDY NO. 4, at 27 (1972).

49. J. SAX, WATER LAW CASES AND COMMENTARY 207 (1965).

does not automatically compel the conclusion that one party should compensate another.⁵⁰ Ultimately, the protection of juniors must be defended as distributively fair. Appropriators on a stream are members of the relevant user community and access must be widely shared; a junior

frequently cannot ascertain what portion of the flow of a stream is natural and what portion represents return flow from upstream users; thus, he cannot assess the risk which a transfer by an upstream user poses. This rule protects him against risk, and, thereby, encourage [sic] full development of the resource at an early stage⁵¹

This accounts for the fact that the doctrine of prior appropriation rejects the riparian rule that water must be used on riparian land for initial allocations, but often imposes riparian-like restrictions on transfers by giving juniors an extra measure of return flow protection.⁵²

The subordination of equity to efficiency is equally well demonstrated by the relative definition of beneficial use and the law's treatment of conserved water. It is axiomatic that water may only be appropriated for a beneficial use. As Wiel stated, "[t]he intention must be *bona fide* and not for speculation, such as the intention to

50. Mishan, *The Post-War Literature on Externalities* 9 J. ECON. LIT. (1971).

51. Gould, *Water Use and the Prior Appropriation Doctrine*, in WESTERN WATER; EXPANDING USES/FINITE SUPPLIES, *supra* note 12.

52. *E.g.*, Basin Electric Power Coop. v. State Bd. of Control, 578 P.2d 557, 566 (Wyo. 1978) (Power company which purchased agricultural water rights prohibited from using water which historically returned to stream from which it was taken because Wyoming law "forecloses anyone desiring to effect a change of use from transferring more water than has been historically consumptively used, regardless of the injury or lack thereof to other appropriators.") (emphasis in original). An extreme example is *Ensenada Land & Water Assoc. v. Sleeper*, No. RA-84-53(C) (Dist. Ct. Rio Arriba County, N.M., June 2, 1985), *appeal filed*, which invalidated a change of use from agriculture to a resort, even though no injury to junior users was demonstrated, in order to maintain the traditional northern New Mexico culture. See J. WESCOAT, *supra* note 42, for a useful case study of the difficulties of transferring water rights, and Trelease, *Policies For Water Law: Property Rights, Economic Forces, and Public Regulation*, 5 NAT. RESOURCES J. 1, 29-34 (1965), for a lucid discussion of the relationship between this rule and welfare maximization. The protection of junior rights may be seen as an example of the tendency of small, close-knit communities to arrange resource sharing arrangements to their mutual advantage. Professor Robert C. Ellickson has recently published a pioneering empirical study of cattle trespass in a rural Northern California county. The study set out to test the Coase hypothesis, Coase, *The Problem of Social Cost*, 3 J. LAW & ECON. 1 (1960), but ended up concluding that formal rights may often be subordinated to sharing rules that promote the long run mutual advantage of the community. Ellickson, *Of Coase and Cattle: Dispute Resolution Among Neighbors in Shasta County*, 38 STAN. L. REV. 623 (1986). Similarly, anthropologists report that some African tribes impose minimal sanctions for the illegal use of water. E. GOLDSMITH & N. HILDYARD, *THE ENVIRONMENTAL AND SOCIAL EFFECTS OF LARGE DAMS* 282-87 (1984).

store water for monopoly.”⁵³ The necessity for a productive use allowed users to protest what they perceived as non-productive uses, but the courts were unwilling to engage in any meaningful comparison of alternative uses. For example, in the famous case of *Empire Water and Power Co. v. Cascade Town Co.*,⁵⁴ a power company claimed that it could dry up a canyon and scenic water fall, which were the basis for a resort community, because the vested appropriation was not for a beneficial purpose. “[T]he views and standards of the early settlers were reflected in the state Constitution. . . . [T]hey did not plan for rest and recreation.”⁵⁵ Colorado was already on its way to a recreation economy and this view of beneficial use was “too narrow” for the court. Courts have generally declined to distinguish between beneficial and non-beneficial uses so long as the use has recognized social and threshold economic value.⁵⁶ In recent years, instream uses have been integrated into the prior appropriation system with comparatively little theoretical difficulty.⁵⁷ Preferences are used to rank uses, to the extent that any ranking is done, and legislative preferences are often inverse to the economic value of the use.⁵⁸

Beneficial use does little to promote allocative efficiency because the doctrine early became almost exclusively equated with the prohibition of waste rather than with the comparative value of alternative uses.⁵⁹ The concept of beneficial use became an integral part of the Wyoming permit system of water administration that was gradually adopted in the West.⁶⁰ It was used to cut down the large paper appropriations that plagued the administration of water rights and to confine irrigators to the amount of water actually used to grow crops.⁶¹ Efficient practices were not promoted by defining non-beneficial as waste because it was easy for an irrigator to protect his right against charges that his irrigation practices were wasteful.⁶² Some egre-

53. S. WEIL, *supra* note 36, at 407.

54. 205 F. 123 (8th Cir. 1913).

55. *Id.* at 128.

56. For example, *Kaiser Steel Corp. v. W.S. Ranch Co.*, 81 N.M. 414, 467 P.2d 986 (1970), held with some reluctance that use of water for coal mining is a beneficial public use under a New Mexico statute authorizing the condemnation of ditch rights of way. “It is beneficial use that is of primary importance, not the particular purpose (ultimate use) to which the water is put.” *Id.* at 419, 467 P.2d at 991 (emphasis in original).

57. See Tarlock, *Appropriation for Instream Flow Maintenance: A Progress Report on “New” Public Western Water Rights*, 1978 UTAH L. REV. 211.

58. Domestic and agricultural uses are generally preferred to other uses. *E.g.* UTAH CODE ANN. aa 73-3-21 (1953).

59. *E.g.*, *Union Mill & Mining Co. v. Dangberg*, 81 F. 73, 93-96 (C.C.D. Nev. 1897).

60. R. DUNBAR, *supra* note 41, at 99-132.

61. *Stenger v. Tharp*, 17 S.D. 13, 94 N.W. 402 (1903).

62. This is not a new criticism. Fisher, *Western experience and Eastern Appropriation Proposals*, in *THE LAW OF WATER ALLOCATION IN THE EASTERN UNITED STATES*, 75, 107-18 (D. Haber & T. Bergen eds. 1956).

giously wasteful uses were prohibited,⁶³ but the concept was explicitly not technology-forcing.⁶⁴ Custom became the main factor in defining beneficial use. An inefficient use practice remained beneficial as long as it was generally used in the community.⁶⁵ In fact, the necessity for beneficial use may have promoted inefficient, premature uses.⁶⁶ Moreover, a user who upgraded his technology faced the risk of a partial loss of his water right because the logic of the beneficial use doctrine suggested that conserved water had been made available for appropriation by others.⁶⁷

The persistence of the goal of fair distribution in the water using community is nicely illustrated by the limited success of a recent effort by major environmental organizations to incorporate efficiency principles into the concept of beneficial use. In one of the first reclamation projects, the Newlands project in Nevada, Department of Interior landowner contracts limited water duties to a maximum of three acre feet per acre. However, a federal court awarded duties of 3.5 and 4.5 acre feet for bottom and bench land respectively. The Environmental Defense Fund and the Sierra Club intervened and argued "that the diversion of a certain quantity of water may have been reasonable at the time that it was originally made, but that the subsequent development of more efficient technology may, over time, require that the original quantity of water diverted be reduced in order to reduce waste."⁶⁸ This argument earned the dictum that "beneficial use expresses a dynamic concept, which is 'variable' according to conditions . . . and therefore over time;" but on the merits the finding that the district's current use was beneficial was upheld.⁶⁹

63. Wiel cites an early case prohibiting the construction of a dam, spreading out the water for cattle to wallow in, so that much is lost by evaporation, as an example of a use held to be non-beneficial. S. WIEL, *supra* note 36, at 508-09.

64. *State ex rel. Crowley v. District Ct.*, 108 Mont. 89, 97-98, 88 P.2d 23, 29-30 (1939), and *Middelkamp v. Bessemmer Irrigating Co.*, 46 Colo. 102, 113-15, 103 P. 280, 283-84 (1903). *Contra* *Rodgers v. Pitt*, 129 F. 932, 943-44 (C.C.D. Nev. 1904) (dictum).

65. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 ORE. L. REV. 483, 491 (1982).

66. Williams, *supra* note 45.

67. *But cf. Nahas v. Hulet*, 106 Idaho 37, 41, 674 P.2d 1036, 1040 (1984) (court rejected argument that senior right should be reduced because of the substitution of sprinkler for flood irrigation). See generally Comment, *Water Saved or Water Lost: The Consequences of Individual Conservation Measures in the Appropriation States*, 11 LAND & WATER L. REV. 435 (1976).

68. Motion For Leave To File Brief As Amici Curiae and Brief For Amici Curiae Environmental Defense Fund and Sierra Club at 8-9, *United States v. Alpine Land & Reservoir Co.*, 697 F.2d 851 (9th Cir. 1983).

69. *United States v. Alpine Land & Reservoir Co.*, 697 F.2d 851, 855 (9th Cir. 1983). The Montana Supreme Court has recently reached a similar conclusion in an analogous situation. *McDonald v. State*, Mont. , 722 P.2d 598 (1986). In 1973, Montana enacted a general water rights adjudication procedure, MONT. CODE ANN. aaaa 85-2-201 to 85-2-243 (1985). Pre-1973 rights are generally defined in

Efficient use practices are best promoted through incentives, and the ideal incentive is to price water at its replacement value.⁷⁰ One way to achieve this is to allow those who conserve water to sell it on an open market. The saver's expectation that he will have the right to sell the saved water free of junior claims was nicely put in a 1914 Colorado case: "Suppose under the seepage statute one drains part of his own lands, and develops water sufficient to irrigate the remainder, may he not sell his water right, and use the developed water, or must he as a penalty for reclaiming his land lose his water right?"⁷¹ Consistent with this early sensible analysis, there is substantial precedent that salvaged water belongs to the saver.⁷² However, there were enough exceptions to the rule, qualifications of the saver's right, and celebrated cases where the saver was penalized rather than rewarded, to chill investment. Prior users have little, if any, duty to take steps to avoid carriage losses in order to preserve their rights.

Three infamous examples are *State ex rel. Cary v. Cochran*,⁷³ *Salt River Valley Water Users Association v. Kovacovich*,⁷⁴ and *Southwestern Colorado Water Conservancy District v. Shelton Farms*.⁷⁵ *Cary* involved a call by downstream seniors against distant juniors. The Nebraska Supreme Court refused to apply the futile call doctrine and enforced priorities between upstream junior and downstream senior irrigators on the North Platte River even though carriage losses from

terms of flow rates. The state would like to substitute volume rates to encourage conservation, which might guarantee less water in dry years, but the Montana Supreme Court has held that pre-1973 rights must be defined in terms of flow and volume, limited by beneficial use.

Thus if in a rare case a beneficial use under a pre-1973 water irrigation right required a greater amount of water than the acre feet fixed in the decree, and such beneficial use was within the pre-1973 flow-rate appropriation as to the pattern of use and means of use, the amount required by beneficial use would control, though it exceeded the acre feet fixed in the decree.

McDonald v. State, 722 P.2d 598, 606 (1986) (dictum). The Wyoming Supreme Court has said in dictum that historical beneficial use can be used to support a quantification of rights in excess of the statutory standard of one c.f.s. per 70 acres. *Zezas Ranch, Inc. v. Board of Control*, 714 P.2d 759, 764 (Wyo. 1986).

70. WATER AND AGRICULTURE IN THE WESTERN U.S., *supra* note 26, at 97-98.

71. *Ironstone Ditch Co. v. Ashenfelter*, 57 Colo. 31, 43, 140 P. 177, 181 (1914).

72. *Stevens v. Oakdale Irrigation Dist.*, 13 Cal.2d 343, 90 P.2d 58 (1939) (salvage of "foreign" water); *Bower v. Big Horn Canal Ass'n*, 77 Wyo. 80, 307 P.2d 593 (1957). See Pring & Tomb, *License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West*, 25 ROCKY MTN. MIN. L. INST. 25-1, 25-26 to 25-28 (1979). The confusing welter of categories that the courts developed to classify saved water are well-detailed in Clark, *Background and Trends in Water Salvage Law*, 15 ROCKY MT. MIN. L. INST. 421, 431-41 (1969).

73. 138 Neb. 163, 292 N.W. 239 (1940). *Contra* *Glen Dale Ranchers v. Shaub*, 94 Idaho 585, 494 P.2d 1029 (1972) (dictum).

74. 3 Ariz. App. 28, 411 P.2d 201 (Ct. App. 1966).

75. 187 Colo. 181, 529 P.2d 1321 (1974).

evaporation were seventy-seven percent of the summer flow. *Kovacovich* refused to allow an appropriator who lined his ditches to use the saved water on lands not under irrigation when the original water right was perfected because he was no longer putting all the water to beneficial use on the lands initially irrigated. "[C]ommendable practices do not in themselves [sic] create legal rights."⁷⁶ *Shelton Farms* involved the classification of water saved from the elimination of phreatophytes (water consuming plants) on an over-appropriated river. The saver claimed that the water was "developed" and thus free from the call of the river, but senior appropriators argued once part of the river, always part of the river. The seniors prevailed on a reparations theory. "[T]he question is not whether prior appropriators are injured *today* by [the saver's] actions. The injury occurred *long ago*, when the water-consuming trees robbed consumers of water which would have naturally flowed to their use." *Shelton Farms* is still good law in Colorado.⁷⁷

It is easy to criticize these decisions on both technical and allocative efficiency grounds.⁷⁸ They tend to freeze-in potentially inefficient use patterns, place no duty on water users to upgrade use technologies as a condition to enjoyment of the right, and create disincentives to save water. This does not mean that the cases are wrong, however. *Shelton Farms* can perhaps be defended on environmental grounds, for example.⁷⁹ The important point for this Article is that these decisions show the legacy of the preference for equity over efficiency. They are part of the doctrine of prior appropriation's historic protection of junior and senior appropriators who depend on return flows. The relevant protected class is the entire community of water users, and the stan-

76. Salt River Valley Water Users Ass'n v. Kovacovich, 3 Ariz. App. 28, 30, 411 P.2d 201, 203 (Ct. App. 1966).

77. Giffen v. State, City & County of Denver, 690 P.2d 1244 (Colo. 1984). Colorado law allows groundwater users to increase groundwater pumping by the development of plans for augmentation. Water saved by the eradication of phreatophytes does not qualify as a plan for augmentation. COLO. REV. STAT. aa 37-92-103(9) (Supp. 1983). *Giffen* denied a plan for augmentation to a proposal to replace fir trees with less water-consumptive grasses claiming that the trees were not phreatophytes. The court held that the legislature did not intend to allow the removal of non-phreatophyte vegetation to be "the basis for a developed water right outside of the priority system." *Griffen v. State, City & County of Denver*, 690 P.2d 1244, 1248 (Colo. 1984).

78. *E.g.*, Governor's Commission to Review California Water Rights Law, Final Report 61 (1978); Yeutter, *A Legal-Economic Critique of Nebraska Watercourse Law*, 44 NEB. L. REV. 11, 39-43 (1965).

79. "We believe that in this situation unrestrained self-help to a previously untapped water supply would result in a barren wasteland." Southwestern Colo. Water Conservancy Dist. v. Shelton Farms, 187 Colo. 181, 191, 529 P.2d 1321, 1327 (1974). This reading of *Shelton Farms* has been used to deny developed water rights to a resort that drained a 3000 year old peat moss marsh. *R.J.A., Inc. v. Water Users Ass'n*, No. 6, 690 P.2d 823 (Colo. 1984).

dard of protection is the average rather than the efficient use pattern.⁸⁰

III. THE MEANING OF WATER CONSERVATION FROM THE CONSERVATION ERA TO 1980

The enlightened thought in America is, today, becoming more and more directed toward the great need of the conservation of national resources and of our national strength and virility, and more and more does it call out against the prodigal waste of life, and health and natural resources which have, in the past, so characterized our national growth.⁸¹

A. 1890-1920

Water resource allocation in the twentieth century has been dominated by three major legacies from the conservation era: (1) the legitimacy of the use of the police power to restrict private initiative,⁸² (2) the acceptance of public management of natural resources,⁸³ and (3) the need for scientifically planned management. There were initially many strains to the conservation movement. Both the Enlightenment tradition of scientific experimentation and the anti-rational tradition of the Romantic movement, which embraced and deified nature without trying to subdue her through understanding,⁸⁴ were represented in the conservation movement and continue to shape the debate about natural resources today. However, the seminal legacy of the movement with respect to water resources allocation is a mixture of theory and practical experience with the problem of promotion of economic development in the arid West. This development stressed the maximum technical development of river systems with an eye half-cocked to the costs and benefits of the projects that this policy produced. The Jeffersonian ideal of a yeoman economy came to be equated with a scientifically planned and managed irrigation economy.

Ultimately, the conservation movement came to mean the maximum development of all resources. It was linked to a faith in progress

80. This is Dean Trelease's defense of *State ex rel. Cary*. Trelease, *The Model Water Code, the Wise Administrator, and the Goddam Bureaucrat*, 14 NAT. RESOURCE J. 207, 227 (1974).

81. Bruce, *The Conservation of Our Natural Resources and Of Our National Strength and Virility*, 59 U. PA. L. REV. 125 (1909).

82. *E.g.*, *National Audubon Soc'y v. Superior Court*, 33 Cal. 3d 419, 658 P.2d 709, 189 Cal. Rptr. 346 (1983).

83. Advocates of resource privatization have mounted a major theoretical attack on public ownership and management, but it has not yet commanded widespread political acceptance. The case against retention is set out in *PRIVATE RIGHTS AND PUBLIC LANDS* (P. Truluck ed. 1983).

84. The relationship between romantic and religious attitudes toward nature, which changed our appreciation of things wild, and the late nineteenth century movement to preserve natural areas is the subject of Roderick Nash's definitive *WILDERNESS AND THE AMERICAN MIND* (3d ed. 1982).

through the application of science and technology. The elimination of waste and maximum utilization of water were the themes of conservationists, but for both ideological and political reasons, maximum water utilization became a rationale for massive federal subsidies rather than the efficient use of water.⁸⁵ Although the idea of scientific planning lived on within the departments of Agriculture and Interior after the conservation movement lost its place on the national political agenda in 1920, the driving force behind resource development was the politics of western resource development.⁸⁶

Irrigation advocates contributed the idea that the conservation of water resources meant the construction of large-scale multiple-purpose projects. Existing irrigation practices were attacked as wasteful because they did not utilize waters to the maximum extent technically possible, and private and state financial resources were seen as inadequate to construct the necessary storage and distribution works. Irrigation advocates successfully argued that the right policy to achieve maximum utilization of water was to store spring runoffs for later use in the summer. Reservoir construction became the definition of conservation.⁸⁷ "The word used by engineers to refer to the work of rationalizing the rivers of the West, and nature in general, was 'conservation.'"⁸⁸

Today we think of irrigated agriculture as a powerful political lobby, but it is important to realize that its triumph was not inevitable. We look at its physical successes—the reservoirs and canals that vein the western landscape—and its ability to dominate the national and state water agenda during most of this century. However, the irrigation movement started as a utopian ideal in many parts of the west.⁸⁹ Small-scale colonies, following the Mormon model, settled what is now Anaheim, California and Greeley, Colorado. Private irrigation companies followed, but "[t]hey had a reputation in the West for being grasping and unscrupulous. Often they contracted to supply water they could not deliver in the dry part of the summer. And their rates

85. The tension between the scientific management which supported the concentration of economic power in the large corporation on the one hand, and the conception of the good society as an agrarian one on the other, was the subject of Richard Hofstadter's *THE AGE OF REFORM* (1959). For an excellent case study of the tendency of conservationist thinking to subordinate efficiency to preconceived moral notions of right and wrong in the name of scientific planning, see R. NELSON, *supra* note 10.

86. The "ditching" of the Colorado is well told in P. FRADKIN, *A RIVER NO MORE: THE COLORADO RIVER AND THE WEST* 235-318 (1981).

87. S. HAYS, *CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT 1890-1920*, at 5 (1959).

88. D. WORSTER, *supra* note 4, at 154.

89. See generally D. PISANI, *FROM THE FAMILY FARM TO AGRIBUSINESS: THE IRRIGATION CRUSADE IN CALIFORNIA AND THE WEST, 1850-1931* (1984).

were exorbitant. They usually ended in failure."⁹⁰

Irrigated agriculture was initially opposed by the cattle ranchers and, in California, by the wheat ranchers in the central Valley made famous by Frank Norris' *The Octopus*. Environmental objections—standing water would become a breeding ground for disease carrying mosquitoes—and fiscal misgivings were also raised against a large-scale public commitment to irrigated agriculture. But, by the end of the nineteenth century, the politics of western development and those of land distribution and social reform fused to produce the support for federal promotion of the irrigation society that we know today. "The ideal of the family farm . . . became an integral part of the movement linking economic development, resource conservation and social progress in an appeal which gradually gained support at the national level for programs designed primarily to benefit the West."⁹¹

Reclamation of the arid West was originally supported for both economic and social objectives.⁹² This experiment continues to complicate the debate over the meaning of conservation, because federal and state water developments of dubious efficiency came to be seen as an "entitlement." Proponents of the Reclamation Act of 1902 saw it as a way of promoting western economic development and of providing a safety valve for social unrest by holding out the promise of land ownership. The reclamation program drew settlement to remote areas of the West, but it also concentrated pre-existing power and resources, as in the San Joaquin and Imperial Valleys of California.⁹³ The debate over the social and environmental consequences of reclamation is still in progress. For purposes of this Article, the point is that the reclamation program gave both large and small farmers a taste for federal subsidies and a moral, even lyrical, justification for them that has made it difficult for future generations to discipline water allocation in the name of economic efficiency.⁹⁴ Small farmers got reclamation bailouts and large farmers got waivers of the anti-monopoly provisions

90. F. MERK, HISTORY OF THE WESTWARD MOVEMENT 508 (1978). See R. DUNBAR, *supra* note 41, at 23-28, for an account of some of these enterprises and the opposition to their rates.

91. W. KARHL, *supra* note 19, at 31.

92. Fischer, Harnsberger, & Oeltjen, *Rights To Nebraska Streamflows: An Historical Overview with Recommendations*, 52 NEB. L. REV. 313, 342-50 (1973) (recounting the growth of the movement in Nebraska in response to the great drought of 1890).

93. See M. GOODALL, WATER SYSTEM ENTITIES IN CALIFORNIA: SOCIAL AND ENVIRONMENTAL EFFECTS IN SPECIAL WATER DISTRICTS: CHALLENGE FOR THE FUTURE 71 (J. Corbridge ed. 1984).

94. The Department of Interior's recent settlement of a suit over water service contract obligations, repayment, and drainage charges between the Westlands Water District in California and DOI has been attacked because it unjustifiably continues the District's subsidy. Western States Water No. 638, Aug. 8, 1986.

of the 1902 Act.⁹⁵ Both got abundant and artificially cheap water in the name of regional equity.

B. 1920-1980

In the forty years between the end of the progressive conservation era and that of the Kennedy-Johnson era, the concept of conservation as supply augmentation through physical storage and transportation of water reached its zenith. But a Hegelian dialectic was at work; the magnitude and costs of the projects ultimately led to increasingly critical evaluations of their benefits and set in motion the forces that now seek to turn resources policy toward market reallocation of existing supplies.

Multiple-purpose projects originated between 1880 and 1910 as projects began to be authorized for secondary as well as primary purposes. This led to the concept of integrated basin planning that rested on three premises: "1. Development programs should be made to serve multiple-purposes; 2. the programs should extend to entire river basins, or, in the case of a majority tributary, to the entire tributary basin; and 3. the programs should serve to facilitate comprehensive regional development programs."⁹⁶ Multiple-purpose river basin development was endorsed in the 1909 report of the National Conservation Commission⁹⁷ and became the official federal water resources policy in the 1920s.

In the New Deal, large-scale multiple-purpose water resources projects were constructed in accordance with comprehensive river basin development plans to help prime the nation's economy through public works projects.⁹⁸ The pre-New Deal Boulder Canyon Project led to major projects in California and in the Columbia and Missouri basins as well. Smaller structures and farm management programs were also developed.⁹⁹ Initially, there was doubt about the constitu-

95. *E.g.*, *Bryant v. Yellen*, 447 U.S. 352 (1980) (upholding a 1933 Secretarial waiver of what was then a 160 acre limitation for private land within the Imperial Irrigation District). R. REISNER, *CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER* (1986) is a colorful history of the Bureau of Reclamation.

96. F. LAURENT, *THE GROWTH OF WATER RESOURCES LAW AND THE AMERICAN FEDERAL SYSTEM* 191 (1980).

97. *REPORT OF THE NATIONAL CONSERVATION COMMISSION*, S. DOC. No.676, 60th Cong., 2d Sess. (1909).

98. *THE REPORT OF THE PRESIDENT'S WATER RESOURCES POLICY COMMISSION*, *WATER RESOURCES LAW* 410-42 (1950) contains a history of federal river basin planning efforts. The Water Facilities Act of 1937, Pub. L. No. 86-624, 50 Stat. 869, (repealed 1961), recited "wastage and inadequate utilization of water resources on farm, grazing, and forest lands in the arid and semiarid areas of the United States resulting from inadequate facilities for water storage and utilization" as a cause of resource destruction, injuries to public health, crop failures and a decline in the standard of living.

99. For example, the Water Conservation and Utilization Program was a dust bowl

tionality of multiple-purpose river basin development because federal power was tied to navigation enhancement, but the New Deal Supreme Court affirmed the constitutionality of multiple-purpose development. The Court's two opinions gave maximum discretion to Congress and the water management agencies to implement the idea. *Oklahoma v. Guy F. Atkinson Co.*¹⁰⁰ removed any doubts that the commerce clause allowed multiple-purpose development on main stem navigable waterways and their non-navigable tributaries. The Court refused to review the inter-state distribution of burdens and benefits from a federal multiple-purpose project, and announced the obvious principle that the Constitution does not require that Congress allocate public revenues efficiently. Nineteen years later the Court reaffirmed *Guy F. Atkinson Co.* without qualification.¹⁰¹

Despite the freedom to spend money efficiently or inefficiently, New Deal planners, administrators, and legislators soon faced the problem of having more projects than resources and were, therefore, forced to devise a method of choosing among competing projects. Starting with the Flood Control Act of 1936, Congress began to supplement resource planning criteria with economic criteria and cost-benefit analysis. The attempt to rationalize water resources spending by divorcing it from the pork barrel has continued for more than four decades. Different measurements of benefits and costs are possible but

[i]n practice . . . interagency committees, and especially the Bureau of the Budget (BOB, now OMB) gradually settled on two key principles that have fundamentally shaped the use of benefit-cost analysis. The first was that national economic efficiency would be used as the sole objective to be maximized in benefit-cost analysis, and the second (consistent with the first) was that only benefits to that objective would be considered in evaluating the merits of water resource projects and programs—not community well-being, not environmental quality, not the alleviation of regional poverty.¹⁰²

These objectives were not uniformly shared by Congress and the major water resources agencies that played the cost-benefit analysis game to great advantage. By judicious "accounting," ratios almost always exceeded unity.¹⁰³ However, criticism of water resources devel-

relief program that supported the construction of ponds, small reservoirs, wells and check dams, as well as integrated irrigation and dry land programs in an attempt to get farmers off marginal land. R. HUFFMAN, *supra* note 1, at 134-44.

100. 313 U.S. 508 (1941).

101. *United States v. Grand River Dam Auth.*, 363 U.S. 229 (1960).

102. Andrews, *Economics and Environmental Decisions, Past and Present*, in ENVIRONMENTAL POLICY UNDER REAGAN'S EXECUTIVE ORDER 43, at 46 (V. Smith ed. 1984).

103. For example, the cost-benefit ratio for the proposed Missouri Basin Project was 1 to 1.1 based on a 100 year life with a 2.5% interest rate. THE REPORT OF THE PRESIDENT'S WATER RESOURCES POLICY COMMISSION, TEN RIVERS IN AMERICA'S FUTURE 187 (1950). See generally H. HART, THE DARK MISSOURI (1957).

opment by the "experts" continued and eventually attracted sufficient support within the executive and legislative branches to control the formal debate about federal and, ultimately, state water resources development.¹⁰⁴ The history of federal water resources policy, as reflected in government documents and official commissions, is complex because water resource managers have attempted to accommodate a wide range of uses and management objectives. The recommendations of the major government studies are not always consistent with each other, but two themes stand out in the period from 1950 to the present. The first is the effort to raise environmental quality maintenance to parity with traditional development goals,¹⁰⁵ and the second is the promotion of allocative efficiency, primarily through better project selection and, ultimately, through technical and economic efficiency programs.¹⁰⁶

There have been four major assessments of water policy between 1950 and the present. They have all, with the exception of the 1959 Senate Select Committee study, urged some degree of shrinkage of water development subsidies. President Truman formed a Water Policy Commission in 1950 that made an extensive survey of existing plans, studies, and laws. The Commission endorsed the idea of multiple-purpose development for a variety of objectives, but urged that federal plans and monies be better targeted to promote a more efficient allocation of resources.¹⁰⁷ Water resources policy was the responsibility of the Federal Inter-Agency River Basin Committee, established in 1943, and in 1950 it published a cost-benefit manual. The famous "Green Book" was only a guide for the resource agencies, but it helped to establish the idea that there should be high level coordination and oversight of water policy.¹⁰⁸ In late 1952 the Bureau of the Budget was stimulated to issue its controversial Circular A-47, which further tightened, at least in theory, executive oversight of

104. The post-World War II tension among economists, congressmen and water agency professionals is analyzed in Marshall, *Politics and Efficiency in Water Development* in WATER RESEARCH 291 (A. Kneese & S. Smith eds. 1966).

105. The beginnings of this movement are traced in B. HOLMES, *supra* note 11. See also U.S. WATER RESOURCES COUNCIL, SUMMARY ANALYSIS OF THE PUBLIC RESPONSE TO THE PROPOSED PRINCIPLES AND STANDARDS FOR PLANNING WATER AND RELATED LAND RESOURCES AND DRAFT ENVIRONMENTAL IMPACT STATEMENT (1972).

106. An important example of the increasing concern of Congress with the efficient allocation of public resources is a three volume study on the evaluation of public expenditures commissioned by the Joint Economic Committee in 1969. JOINT ECONOMIC COMM., 91ST CONG., THE ANALYSIS AND EVALUATION OF PUBLIC EXPENDITURES: THE PPB SYSTEM (1969).

107. See THE REPORT OF THE PRESIDENT'S WATER RESOURCES POLICY COMMISSION, *supra* note 103.

108. Merriam, *The Plus Side of the Record*, in PERSPECTIVES ON CONSERVATION: ESSAYS ON AMERICA'S NATURAL RESOURCES 233 (H. Jarrett ed. 1958).

water spending.¹⁰⁹

President Eisenhower's major water resources policy was "no new starts" for federal water resources projects.¹¹⁰ Consistent with this policy, he supported a formal inter-agency project coordination and review committee. The West's response to Republican fiscal prudence was the formation of a Senate Select Committee on National Water Resources,¹¹¹ and in 1961 the Committee issued its report.¹¹² Considerable attention was given to instream uses and non-structural flood control alternatives, but the main thrust of the report called for the comprehensive development and management of all major river basins supported by increased federal and state research and planning. The Senate Report was in fact prepared by Resources For the Future, which was planning a parallel study, and the participation of the distinguished water economist Nathaniel Wollman assured that attention was focused more on the demonstrated, rather than assumed, values of water development. However, the overall focus of the report remained maximum development, with technological conservation given considerable prominence.¹¹³

Two major developments in the 1970s laid the immediate theoretical foundation for the current equation of conservation with efficiency. As a result of proposals to supplement water supplies in the Southwest with costly transbasin diversions from the Columbia River system, Congress authorized the formation of the National Water Commission. The 1973 Commission report¹¹⁴ is the most comprehensive, balanced and probing assessment of water policy to date. The immediate impact of the report was lost in the debacle of Watergate, but its thrust resurfaced in President Carter's short-lived Water Policy Initiative and continues to influence the Reagan Administration's

109. P. BLACK, CONSERVATION OF WATER AND RELATED LAND RESOURCES 13 (1982).

110. For a brief account of the development of this policy, see Schad, *An Analysis of the Work of the Senate Select Committee on National Water Resources, 1959-61*, 2 NAT. RESOURCES, J. 226, 227-31 (1962).

111. Hamilton, *The Senate Select Committee on National Water Resources: An Ethical and Rational Criticism*, 2 NAT. RESOURCES J. 45 (1962). Wollman, *Errors In The "Ethical And Rational Criticism" Of The Select Committee by Mr. Roy Hamilton*, 2 NAT. RESOURCES J. 260 (1962) (arguing that the committee was not merely a screen for western water development because the report recommended extensive municipal sewage treatment facility grants and other pollution control expenditures).

112. SENATE SELECT COMMITTEE ON NATIONAL WATER RESOURCES, S. Rep. No. 29, 87th Cong., 1st Sess. (1961). Senator Kerr's experiences with droughts and floods in his native Oklahoma gave him a keen interest in natural resources policy and a strong faith in comprehensive river basin development. See R. KERR, LAND, WOOD AND WATER (1960).

113. *Id.* See generally McGuinness, *An Analysis of the Report of the Senate Select Committee on National Water Resources*, 2 NAT. RESOURCES J. 187 (1962).

114. NATIONAL WATER COMMISSION, *supra* note 22.

water policy, which is based on increased cost sharing between the federal government and project beneficiaries.

Water Policies For the Future gently but firmly called for an end to a federal water policy based on inter-regional subsidies in the name of equity. It called for a policy in which efficient allocation and the promotion of environmental quality would be the primary goals of water management. Among the major recommendations were (1) no expansion of existing federally subsidized irrigated acreage,¹¹⁵ (2) *marginal* cost-based pricing of municipal and industrial as well as *agricultural* water,¹¹⁶ (3) a strict adherence to consumer willingness to pay as the basis for project evaluation,¹¹⁷ and (4) reform in project cost-sharing formulas to promote the efficient use of water.¹¹⁸

Soon after he took office, President Carter and his environmental advisors decided to apply more than three decades of criticism of federal policy to the federal government and to the states. Existing projects, including such icons as the Central Arizona Project were put on a "hit list" for "deauthorization." The Water Resources Council developed a series of options to tilt federal policy toward conservation and the enhancement of environmental values.¹¹⁹ President Carter announced that water development projects would be subject to an independent review process in which cost-benefit analysis would be played straight and in which federal power and fiscal leverage would be used aggressively to encourage conservation. Conservation was defined mainly as the efficient allocation of water resources.¹²⁰ Western reaction was immediate and fierce. Led by Governors Lamm of Colorado and Matheson of Utah, federal policy was denounced in the West as a betrayal of the entire history of federal promotion of the region. In his co-authored book, *The Angry West*, Governor Lamm offered a scathing denunciation of the Carter water policy and summed up a colorful review of western water policy with his view of conservation:

One critical assumption is that the damming of western water has spawned a kind of "waste ethic" among westerners, the belief that rather than conserve the water they have, they should build dams to catch what they have not. The assumption is simplistic: Nonwesterners do not understand, and never have, that their concept of conservation is invalid in the arid West; to them conservation is reduction of *use* (or what Governor Matheson of Utah has called 'the brick-in-the-toilet mentality'), but in the West conservation is *physical control*, or storage. In the desert, reduction of use is implausible, even

115. *Id.* at 141. See also Z. Willey, *supra* note 13.

116. *Id.* at 247-59.

117. *Id.* at 382.

118. *Id.* at 495.

119. Hillhouse & Hannay, *Practical Implications of the New National Water Policy*, 25 ROCKY MTN. MIN. L. INST. 22-1 (1979) (detailing the evolution of the Carter policies).

120. 42 Fed. Reg. 36,794 (1977).

harmful.¹²¹

IV. CONSERVATION STRATEGIES FOR THE FUTURE

Water conservation is not subject to a quick fix. Water allocation is both centralized and decentralized, and there are thousands of diverse actors with different values and incentives. Major water users, especially farmers, have responded to market pressures to adopt new water-saving production systems, but the responses have been uneven throughout the West.¹²² A complex web of state and local governmental institutions promote water conservation through methods that range from regulation to information dissemination and voluntary cooperation among water users.

Today, many water policy analysts, and increasingly, regulators, are interested in moving beyond neutrality toward water conservation. A wide variety of conservation agendas have been proposed and are working their way through various institutions. A comparative analysis of the different proposals is beyond the scope of this Article, but the general strategies can be outlined and the relationship of these strategies to past allocation practices can be identified to indicate the equity issues that must be resolved in the future. The strategies seek both to remove disincentives toward conservation and to create incentives to conserve.

A. Forcing Technology

The models provided by the Clean Air and Clean Water Acts could be used to set efficient use standards to force the development of conservation technologies. Just as local custom has evaporated in medical malpractice, beneficial use could be interpreted to require the adoption of efficient use practices.¹²³ This strategy is undesirable for two

121. R. LAMM & M. MCCARTY, *THE ANGRY WEST: A VULNERABLE LAND AND ITS FUTURE* 190 (1982). Governor Lamm has since recanted much of his argument. *A New Era in Western Water Policy*, J. AMER. WATER WORKS ASSOC. 12 (1986).

122. OFFICE OF TECHNOLOGY ASSESSMENT, *supra* note 2, at 141.

123. *E.g.*, *People ex rel. State Water Resources Control Bd. v. Forni*, 54 Cal. App. 3d 743, 126 Cal. Rptr. 851 (1976) (direct diversion for frost protection of grape vines was an unreasonable use because simultaneous demand from all viticulturists could exhaust the flow of the river). Technology-forcing strategies have been used against large entities. The Environmental Defense Fund has successfully used the California state constitutional prohibition against unreasonable use and waste to force the State Water Resources Control Board to consider waste water reclamation as an alternative to new diversions. *Environmental Defense Fund, Inc. v. East Bay Mun. Util. Dist.*, 20 Cal. 3d 327, 572 P.2d 1128, 142 Cal. Rptr. 904 (1977), *vacated in light of* *California v. United States*, 439 U.S. 811 (1978). On remand, the California Supreme Court held that state consideration of waste water reclamation alternatives was not preempted by federal law authorizing the project in question, but the court applied the doctrine of primary jurisdiction to send the issue to the State Water Resources Control Board. 26 Cal. 3d 183, 605

reasons. First, it is inefficient. One of the major lessons of the Clean Air and Water Acts is that technology-forcing can produce an inefficient allocation of resources.¹²⁴ There is a risk that too much water will be saved for inefficient uses. Second, the strategy depends on a deep pocket to pay for the technology. In the administration of the Clean Air and Water Acts, EPA has been able to take the position that it can force any technology that does not bankrupt the industry¹²⁵ because the acts apply primarily to large industries. The same position can be taken with large irrigation districts and other public water authorities, but it would be unfair (as well as inefficient) to force all irrigators to adopt the same level of technology, assuming the information to develop the standards exists.¹²⁶

Technology-forcing may be appropriate where a resource has been historically over-used, the value of the resource is high, and a sufficient consensus exists within the water using community about the need to conserve. This partially describes the situation in Arizona. Prior to 1980 the state mined its groundwater, but legislation was passed that year that was designed to achieve safe-yield for the three major urban areas of the state by 2025.¹²⁷ To accomplish this goal, management plans for Phoenix, Prescott and Tucson must be developed. Those plans could require technology-forcing conservation

P.2d 1, 161 Cal. Rptr. 466 (1980). In another example, the Texas Water Commission, Water Rights Division, has required state of the art transmission practices in an adjudication in order to cut back the claims of large rice farmers in the Colorado-Lavaca coastal basin. The claims were based on old certified filings. The new standard required was based solely on technological feasibility. The Commission's final determination is still subject to judicial review under TEX. WATER CODE ANN. aaaa 317-20 (Vernons 1986). Interview with Ms. Lee Jones, Chief Hearing Examiner, Water Rights Division, College Station, Texas, (Aug. 12, 1986). The gap between expert analysis and popular attitudes about water efficiency are detailed in PUBLIC AGENDA FOUNDATION, WATER EFFICIENCY IN THE WEST: THE PUBLIC'S VIEW (1986).

124. The literature is summarized in Ackerman & Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333 (1985). But see Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267 (1985).
125. *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011 (D.C. Cir. 1978).
126. Kansas has recently adopted a state water plan that preserves the state option to incorporate conservation plans into the basin planning process and to prepare flexible conservation guidelines. The state can require individual irrigators and those who seek to use water claimed by the state but stored behind federal reservoirs to prepare conservation plans on a case by case basis. KANSAS STATE WATER PLAN: CONSERVATION SECTION, SUB-SECTION: AGRICULTURAL WATER CONSERVATION (1985). The plan rejects the mandatory preparation of plans by all irrigators.
127. ARIZ. REV. STAT. ANN. aa 45-562.A (Supp. 1985). The constitutionality of the Act has been twice upheld. *Town of Chino Valley v. City of Prescott*, 131 Ariz. 78, 638 P.2d 1324 (1981), *appeal dismissed*, 457 U.S. 1101 (1982); *Cherry v. Steiner*, 543 F. Supp. 1270 (D. Ariz. 1982), *aff'd*, 716 F.2d 687 (9th Cir. 1983), *cert. denied*, 466 U.S. 931 (1984).

measures. For example, after 1986, a municipality may not serve a newly planted roadside or median unless it is planted with low-water-using plants. Industrial users must use the latest available conservation technology consistent with a reasonable economic return.¹²⁸

B. Subsidies for Conservation

In general, conservation strategies focus on withdrawing federal subsidies for agricultural production such as price supports, commodity loans, and artificially cheap water; however, subsidies have been defended as a fair method of promoting conservation objectives. States that seek to promote equity among water users will still be attracted to subsidies. For example, Montana has chosen to use coal severance tax revenues to subsidize loans to individual farmers for improving irrigation efficiency.¹²⁹

Market-induced subsidies or "bribes" can, however, be most efficient. The Metropolitan Water District of Los Angeles has proposed to protect its low priority in Colorado River water, which will be reduced by the Central Arizona Project deliveries, by paying the Imperial Irrigation District to improve its water use practices. The saved water would then be available to the MWD.¹³⁰

C. Market Allocation

Market allocation is the preferred solution of welfare economists because it provides the greatest incentives to conserve. Allocation can be by either private or public market. In both cases, it is assumed that the entity will sell the resource at its highest value as reflected by consumer willingness to pay.¹³¹ Private allocation requires creation of firm water rights subject to sale. Public allocation involves public capture, usually through state appropriation of unallocated water, followed by state sale or lease. Montana, for example, has embraced water marketing as part of a general effort to control the allocation of its rights to the headwaters of the Columbia and Missouri Rivers.¹³² New Mexico has shown considerable interest in the idea in order to preserve marginal but culturally rich and diverse water users from the private market.¹³³

128. Rieke, *The Arizona Solution To Allocation and Use of Groundwater*, in WESTERN WATER: EXPANDING USES/FINITE SUPPLIES, *supra* note 12.

129. MONT. CODE ANN. aaaa 85-1-606 to -616 (1985). A similar program exists in Texas.

130. See Z. WILLEY, *supra* note 13, at 29 for an analysis of the economic incentives for a deal. Negotiations are still on-going as of December, 1986.

131. See Frederick, *The Legacy of Cheap Water*, 83 RESOURCES FOR THE FUTURE 2 (1986).

132. REPORT OF THE SELECT COMMITTEE ON WATER MARKETING, 49TH LEGISLATURE, STATE OF MONTANA (1985).

133. N.M. WATER RESOURCES RESEARCH INST. & UNIV. OF N.M. LAW SCHOOL, EXECU-

There are several branches to this strategy. Proposals to increase private transfers include:

1. *Removal of Barriers to Marketability*

Despite the professed indifference of the law of prior appropriation to the place of use, there are major barriers to shifting water from areas of surplus to areas of demand. For example, Professor Harnsberger's scholarship played a major role in persuading the Nebraska Supreme Court to overrule a prior case that prohibited transbasin diversions,¹³⁴ but efforts to shift water between basins continue to arouse intense political opposition. Transfer barriers are a reflection of western states' distrust of markets to allocate water within a state and among states. Many states long prohibited the export of water across state lines. The justification was that water was held in trust for the people of the state and thus was not a mere commodity. *Sporhase v. Nebraska*¹³⁵ put this flawed theory to rest. Water is now a commodity and efforts to block the creation of an interstate market must be tested by the dormant commerce clause. Many states still resist the lesson of *Sporhase*; the idea that markets should allocate water resources to the highest and best use is still vigorously resisted as inequitable.¹³⁶

2. *The Clarification of Rights to Saved Water*

States are taking a number of positive steps to create water rights market. California recently passed legislation that clarifies the rights of savers and gives them title to all conserved water.¹³⁷ Similar legis-

TIVE SUMMARY, STATE APPROPRIATION OF UNAPPROPRIATED GROUNDWATER: A STRATEGY FOR INSURING NEW MEXICO'S WATER FUTURE (1986).

134. *Osterman v. Central Nebr. Power & Irrigation Dist.*, 131 Neb. 356, 268 N.W. 334 (1936), was overruled in *Little Blue Natural Resources Dist. v. Lower Platte N. Natural Resources Dist.*, 206 Neb. 535, 294 N.W.2d 598 (1980) (citing, *inter alia*, Oeltjen, Harnsberger & Fischer, *Interbasin Transfers: Nebraska Law and Legend*, 51 NEB. L. REV. 87 (1971)).

135. 458 U.S. 941 (1982).

136. Utton, *In Search of an Integrating Principle for Interstate Water Law: Regulation Versus the Market Place*, 25 NAT. RESOURCES J. 985 (1985), is an elegant argument that "inscrutable economic" forces "may threaten the territorial integrity of individual states. . . ." *Id.* at 989. A New Mexico district court has refused to approve an application for a change in the point of diversion and use in a rural northern county despite the fact that no injury to junior appropriators was found. The court interpreted the state's statutory public interest criteria to give the court the power to preserve traditional water use practices. *Ensenada Land & Water Assoc. v. Sleeper*, No. RA-84-53(c) (Dist. Ct. Rio Arriba County, N.M., June 2, 1985) *appeal filed*.

137. CAL. WATER CODE aa 1011(b) (Deering Supp. 1986). Section 1011(a) defines conservation as "the use of less water to accomplish the same purpose or purposes of use allowed under an existing appropriative right" including land fallowing or crop rotation. The incentive created by the right to sell the conserved water (sub-

lation has been proposed in other states.

3. *Trimming Existing Rights*

A major barrier to the free transfer of water rights is the uncertainty over what the transferor has to transfer. The principal problem is the vested rights of third parties, but considerable attention also has been given to reducing the "transaction costs" of water transfers. Suggestions include shifting the burden of proof to objectors, state funding of data collection in water transfer cases, and allowing transfers "to occur in instances where damage is not clear, subject to later payment of damages should they occur."¹³⁸

The regulation of water use to restrict use also requires that existing rights be trimmed. Water law doctrine often builds in a considerable margin of safety to water rights, and some modest steps can be taken to promote transfers and to support use restrictions by reducing the margin of safety to a water right holder. Both the Colorado courts and legislature have trimmed water rights in recent years and the experience provides a useful case study for other states. Legislative regulation of groundwater pumping prompted the Colorado Supreme Court to contrast protection of vested rights with the policy of maximum utilization. The court opined: "As administration of water approaches its second century the curtain is opening up on the new drama of *maximum utilization* and how constitutionally that doctrine can be integrated into the law of *vested rights*."¹³⁹ Maximum utilization was subsequently applied to hold that silt present in water (which tends to seal ditches) is not part of a vested prior right and, thus, the United States could construct a reservoir and replace dirty with clean water.¹⁴⁰ The concept was further extended to hold that statutory plans for augmentation are valid even if they do not result in 100% surface replacement of water withdrawn by wells,¹⁴¹ and that surface owners may have a duty to use a reasonable means of diversion.

ject to the applicable laws of water transfer) is reinforced by guarantees that the use of less water than allowed by a permit or decreed entitlement because of water conservation efforts "shall be deemed equivalent to a reasonable beneficial use of water to the extent of such cessation or reduction in use," *id.* aa 1011(a), and that such rights cannot be forfeited.

138. Driver, Remarks before the Water Policy Committee of the Montana State Legislature 6 (undated mimeo).

139. *Fellhauer v. People*, 167 Colo. 320, 336, 447 P.2d 986, 994 (1968) (emphasis in original).

140. *A-B Cattle Co. v. United States*, 196 Colo. 539, 589 P.2d 57 (1979). Justice Erickson's dissent would have recognized a right to silt-laden water because to determine "whether a diversion system is reasonably efficient, an issue exists as to whether the earthen ditches are well-constructed and maintained and conform to the conditions and customs of the locality where the water diversion occurs and is applied to a beneficial use." *Id.* at 556-57, 589 P.2d at 69.

141. *Cache LaPoudre Water Users Ass'n v. Glacier View Meadows*, 191 Colo. 53, 550

*Alamosa-La Jara Water Users Protection Association v. Gould*¹⁴² held that senior surface users could be required to switch to wells to avoid an unnecessary call on the river.

Existing water rights are also being trimmed to make more water available for instream flows. An intermediate court of appeals in California has recently applied the public trust doctrine to allow the State Water Resources Control Board to modify federal and state permits to support salinity standards set for the Sacramento-San Joaquin Delta.¹⁴³ Recent federal and state efforts to dedicate water to instream uses are related to the conservation agenda. Conservation initiatives free up water for instream uses and reduce pressures to develop new supplies. The modification of existing rights to support instream uses creates pressure on water rights holders to adopt conservation measures to better use the reduced allocation.

V. CONCLUSION

The continued urbanization and industrialization of the West, the intense financial pressures on irrigated agriculture (and agriculture generally) and the unwillingness of the federal government to finance costly new reclamation projects has moved conservation to a high place on the contemporary water policy agenda. Prior appropriation doctrine and practice is being subjected to intense scrutiny to determine if water laws and practices are neutral toward conservation. The doctrine of beneficial use, based as it is on local irrigation customs, has long been criticized because it creates a disincentive to conserve water. These long-standing criticisms have taken on new urgency, and other disincentives to conserve have been observed and duly criticized.

A full reform agenda has been developed to conserve more water. It involves both modest steps, such as legislation that removes the current ambiguities surrounding "developed" or "saved" water and awards clear title to the saver, as well as more fundamental reforms. The whole concept of beneficial use is being reexamined. Abandonment of local custom as the standard is being widely urged and considered. Water rights would be defined not in terms of historic use patterns but in terms of the water needed to satisfy current demands by the application of technically efficient means of diversion, transpor-

P.2d 288 (1976); *Kelly Ranch v. Southeastern Colo. Water Conservancy Dist.*, 191 Colo. 65, 550 P.2d 297 (1976).

142. Colo. , 674 P.2d 914 (Colo. 1983).

143. *United States v. State Water Resources Control Bd.*, Cal. App. 3d , 227 Cal. Rptr. 161 (Ct. App. 1986). Recovery programs under the Endangered Species Act may depend in part on water conservation efforts. *Western States Water*, No. 640, August 22, 1986.

tation, and application.¹⁴⁴ Transfers—both large and small—would receive positive encouragement by steps designed to “minimize transaction costs”¹⁴⁵ and greater restrictions on use would be imposed.

In many areas of the West, especially Arizona, southern and central California, and Colorado, conservation is a rational way to adjust water use to demand. Historic water use patterns should not be used to control the future, although history may well set the level of compensation necessary to make changes toward more highly valued uses fair. However, in the rush to conserve there is a danger that inefficiencies of the past may be compounded. Technical and economic efficiency must be clearly differentiated. Otherwise, there will be initiatives to require technical but not economic efficiency at great expense to individual users with no corresponding benefit to society.

The substitution of economic efficiency as the sole definition of conservation will solve the problem of compelling the technically possible at costs that exceed the benefits. In general, economic efficiency can be obtained by creating sufficient incentives for the operation of the market. However, governments, although professing great respect for the market, have seldom trusted the allocation of important resources to the market. Water is no exception. In the West, individual water using communities have been allowed to determine how waters should be allocated. This history has created strong expectations or “equities” that these allocations should be continued despite market pressures. The problem of giving greater recognition to public, in-stream uses aside, these historical use patterns are entitled to consideration in the debate over how to reallocate western waters. The weight given them should not be decisive, but it is important to recognize that conservation is only one among several choices open to a state deciding how to maximize the value of its water.

144. *E.g.*, Note, *Reallocating Western Water: Beneficial Use, Property, and Politics*, 1986 U. ILL. L. REV. 277, 291.

145. “In general, transaction costs include the costs of identifying the parties with whom one has to bargain, the costs of getting together with them, the costs of the bargaining process itself, and the costs of enforcing any bargain reached.” M. POLINSKY, *AN INTRODUCTION TO LAW AND ECONOMICS* 12 (1983). Law is all transaction costs, and efforts to move a system toward efficiency generally concentrate on the minimization of transaction costs. B. DRIVER, *WESTERN WATER: TUNING THE SYSTEM*, *supra* note 30, at 53, suggests that states “review their transfer regulations to make sure that the transaction costs associated with transfers are as low as feasible consistent with the protection of vested interests in water use and protection of public values associated with water.” See *id.* at 26-27 for a discussion of the potential high transaction costs of water transfers.