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Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine

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I appreciate the advice of my colleagues at the University of Colorado. Gilbert White, the eminent authority on water policy, took the time to review this manuscript and offer his suggestions at a memorable two-hour session in his office. David Getches and Larry MacDonnell gave me valuable assistance. My research assistant, Scott Hardt, was also a colleague in the fullest sense. His scientific background, acute mind, and willingness to challenge my views are part and parcel of this article.

I dedicate this piece to two long-time Jackson Hole residents, Mardy Murie and Med Bennett, who have given so much inspiration to me and to many others of my generation.

I. INTRODUCTION: THE CLASSIC PRIOR APPROPRIATION DOCTRINE

For almost all of its history, water law and policy has been nearly monolithic throughout the American West. As late as the mid-1970's, substantially the same body of law was in place in every state. To be sure, there were variations. Colorado granted its water rights through the courts rather than through administrative agencies.[1] Oregon had withdrawn from appropriation the streams above some of its scenic waterfalls.[2] California, Oregon, Washington, and the states along the 100th meridian recognized riparian rights along with appropriation rights before abolishing or sharply limiting riparianism.[3] The states moved, however haltingly, in somewhat different directions on groundwater regulation.[4] There were other differences. But in the larger scheme such exceptions were wrinkles at best. As recently as a long decade ago, there was a classic prior appropriation doctrine that governed nearly all water usage in the West.

The classic prior appropriation doctrine's "first in time, first in right" rule is widely known, but there were numerous premises, corollaries, and consequences to the basic formulation. Only certain kinds of uses were allowed.[5] Only the states could grant water rights.[6] State laws not only defined the preferred water rights, they actively promoted and subsidized them — and they successfully enlisted the federal government in the cause.[7] All state constitutions or statutes declared water to be public, but nearly all water was appropriated in the form of vested property rights for private gain.[8] Even superficially public uses had heavy private overtones. The crusades of Los Angeles, Denver, and Phoenix for water in fact have been mainly the crusades of future-looking land developers who had staked out subdivisions on the plains and deserts, and who needed a

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1. COLO. REV. STAT. §§ 37-92-301 to -306 (1973).

2. OR. REV. STAT. § 538.200 (1987).

3. *See generally* 5 R. CLARK, WATERS AND WATER RIGHTS § 423 (1972); W. HUTCHINS, WATER RIGHTS IN THE NINETEEN WESTERN STATES 206-25 (1971); Trelease, *Coordination of Riparian and Appropriative Rights to the Use of Water*, 33 TEX. L. REV. 24 (1954).

4. *See generally* Clark & Arguedas, *Developments in Groundwater Law*, 57 NEB. L. REV. 283 (1978).

5. Under the prior appropriation doctrine, water users can establish a right only to water which is applied to a beneficial use. Historically, only utilitarian uses such as agricultural, domestic, and industrial uses were recognized as being beneficial. Recreational and environmental purposes have recently been recognized as being beneficial uses in many states. *See* Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 488 (1982). With regard to the early view of instream appropriations, one authority stated: "The reservation of large quantities of water in place was thought to be inconsistent with the goal of maximum utilization because a reservation in place was simply not a 'use' as the custom of the region had come to define the term." Tarlock, *Appropriation for Instream Flow Maintenance: A Progress Report on "New" Public Western Water Rights*, 1978 UTAH L. REV. 211, 212 (1978).

6. W. HUTCHINS, *supra* note 3, at 7.

7. *See infra* text accompanying notes 52-59.

8. *See generally* W. HUTCHINS, *supra* note 3, at 5 (public ownership of water in natural streams). While an individual cannot own the water in a natural stream, the right to appropriate water is a vested property right. This right is generally classified as real property in the western states. *Id.* at 442-43. "[T]he important principle is that private ownership of stream water while in its natural environment does not exist; but private rights to extract and use such waters—under State supervision and control in the exercise of its police powers—do exist, and they are property rights." *Id.* at 443.

municipal water supply to complete their ventures. In all cases, water developers had free call on the resource. Colorado announced it in its Constitution but all states practiced it: "the right to divert shall never be denied."[9] As of the early 1970's, nearly all western water was zoned for preferred consumptive uses.

Of course, since the mid-1970's, western legislatures and courts have broken from the classic doctrine in notable respects.[10] Conservation programs have gradually started to come into vogue, most notably for Arizona groundwater[11] and for the Imperial Irrigation District in southern California.[12] Several states have begun to take seriously the public interest statutes, long on the books but hardly ever exercised, when granting new rights.[13] There have been hard looks at the traditional separations of surface water and groundwater and of water quantity and water quality.[14] States are searching out ways to improve their systems of water transfers.[15] Instream flow programs have proliferated, sometimes in the dramatic form of the public trust doctrine.[16] The federal government has taken

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9. COLO. CONST. art. XVI, § 6: "The right to divert the unappropriated waters of any natural stream to beneficial use shall never be denied."

10. *See generally* Wilkinson, *Western Water Law in Transition*, 56 COLO. L. REV. 317 (1985).

11. ARIZ. REV. STAT. ANN. §§ 45-401 to -655 (1987).

12. *See* Underwood, *A Case Study: Imperial Valley, California*, in WESTERN WATER: EXPANDING USES/FINITE SUPPLIES (Natural Resources Law Center, University of Colorado School of Law, Seventh Annual Summer Program, June 2-4, 1986). The Imperial Irrigation District and Metropolitan Water District have proposed a cooperative agreement whereby MWD, a junior user of California's share of Colorado River water, would provide the money to improve Imperial's water system thereby creating conserved water available for use by MWD. It has been estimated that 300,000-400,000 acre-feet of conserved water will be made available by this agreement. *Id.* at 16.

13. *See, e.g.*, Shokal v. Dunn, 109 Idaho 330, 707 P.2d 441 (1985); Stempel v. Department of Water Resources, 82 Wash. 2d 109, 508 P.2d 166 (1973). *See generally* Grant, *Public Interest Review of Water Right Allocation and Transfer in the West: Recognition of Public Values*, in WATER AS A PUBLIC RESOURCE: EMERGING RIGHTS AND OBLIGATIONS (Eighth Annual Summer Program, Natural Resources Law Center, University of Colorado School of Law, June 1-3, 1987); Robie, *The Public Interest in Water Rights Administration*, 23 ROCKY MTN. MIN. L. INST. 917, 935 (1977).

14. *See, e.g.*, Getches, *Controlling Groundwater Use and Quality: A Fragmented System*, 17 NAT. RESOURCE LAW 623 (1985).

15. *See* Dunning, *Reflections on the Transfer of Water Rights*, 4 J. CONTEMP. L. 109 (1977); Getches, *Water Use Efficiency: The Value of Water in the West*, 8 PUB. LAND L. REV. 1 (1987).

16. Historically, states considered instream flows to constitute waste, rather than a beneficial use. Ausness, *Water Rights, the Public Trust Doctrine, and the Protection of Instream Uses*, 1986 U. ILL. L. REV. 407, 419-20. However, there has been a growing realization that water is always in use. Many western states have specifically declared instream flows for recreation and fish and wildlife to be a beneficial use. *Id.* at 420 n. 107. *See also* Tarlock, *The Recognition of Instream Flow Rights: "New" Public Western Water Rights*, 25 ROCKY MTN. MIN. L. INST. 24-1, 24-21 (1979). As of 1988, only three of the western states (Arizona, Nevada, and New Mexico) do not have legislatively created programs to establish instream flows. Shupe, *Keeping the Waters Flowing: Streamflow Protection Programs, Strategies, and Issues in the West* 7, in INSTREAM FLOW PROTECTION IN THE WESTERN UNITED STATES: A PRACTICAL SYMPOSIUM (Natural Resources Law Center, University of Colorado School of Law, March 31-April 1, 1988). The legislatively created instream flow programs fall into four main categories. *Id.* at 8. First, states have withdrawn specified streams from further diversions. Second, some states require their water resource agencies to consider public interest factors when granting new appropriation permits and transfers. Some state statutes

some actions, including reducing the subsidies for reclamation projects,[17] protecting some wetlands,[18] enforcing the Endangered Species Act,[19] reducing point source pollution,[20] and signalling a renewed commitment to combatting non-point source pollution.[21] It has been a time of experimentation, innovation, and leavening, a time when public-spirited citizens have insisted that we ought to step back and take stock of what the public interest is and how it ought to be implemented.

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specify that streamflows are to be considered while others use broad public interest language which has been interpreted to include recreational and wildlife values (instream uses). Ausness, *supra* at 431. Third, some states permit specified state agencies to make appropriations for instream uses. Ausness, *supra* at 429; Shupe, *supra* at 11. Fourth, some states allow the acquisition and dedication of existing water rights to instream flows. Shupe, *supra* at 13-14.

In many areas of the West, streams are fully appropriated. In these watersheds, the first three of these statutory means for establishing instream flows are largely ineffectual, although in some cases a senior consumptive right may be prohibited from moving upstream above a junior instream-flow right by the rule that a junior right is entitled to have maintained the stream conditions that existed on the date of the junior appropriation. *See* Farmers Highline Canal & Reservoir Co. v. City of Golden, 129 Colo. 575, 272 P.2d 629 (1954). The fourth method — acquisition of senior consumptive rights — works as a matter of law in several states but is hampered by limited state funding. The common law public trust doctrine has been invoked by a few courts to protect instream flows from existing water rights. Under the public trust doctrine, instream flows can be protected even though the stream is overappropriated. For a general discussion of the public trust doctrine, see Walston, *The Public Trust and Water Rights: National Audubon Society v. Superior Court*, 22 LAND & WATER L. REV. 701 (1987). The public trust doctrine as applied to water rights recognizes water as a public trust resource and, while the state may grant rights to the use of the resource, the grants remain subject to the trust which may take precedence over vested water rights. Thus, in National Audubon Society v. Superior Court of Alpine County, 33 Cal. 3d 419, 658 P.2d 709, 189 Cal. Rptr. 346, *cert. denied*, 464 U.S. 977 (1983), the court held that appropriative rights in nonnavigable tributaries were subject to reconsideration by the state where necessary to protect the ecology of a navigable lake.

17. Motivated variously by environmental concerns and an ominous Federal budget deficit, recent administrations have greatly reduced funding for Federal reclamation projects. These efforts began with the announcement of President Carter's 1977 "hit list" of 18 water projects. Although Carter eventually signed the 1978 Public Works Appropriations bill, which funded half of the projects on his list, the glory days of the pork barrel Federal reclamation projects had come to an end. *See* M. REISNER, CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER 324-42 (1986). Federal funding of water projects has continued to decline under the Reagan administration. *Id.* at 342-43. Congress has not approved a major new water project since 1976. MOSHER, *The Corps Adapts, the Bureau Founders*, in WESTERN WATER MADE SIMPLE 15, 16 (1987).

18. The Federal Water Pollution Control Act prohibits "the discharge of dredged or fill materials into the navigable waters" except under a permit issued by the Army Corps of Engineers. 33 U.S.C. § 1344(a) (1986). "Navigable waters" is in turn defined as "the waters of the United States." 33 U.S.C. § 1362(7) (1986). The courts have upheld the Corps' broad interpretation of the statute to include wetlands. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 135 (1985).

19. *See, e.g.*, Riverside Irrigation Dist. v. Andrews, 758 F.2d 508 (10th Cir. 1985). *See generally* Tarlock, *The Endangered Species Act and Western Water Rights*, 20 LAND & WATER L. REV. 1 (1985).

20. While there is much debate over the effectiveness of the Clean Water Act in improving overall water quality, the Act has been largely successful in reducing point sources of water pollution. THE CONSERVATION FOUNDATION, STATE OF THE ENVIRONMENT: A VIEW TOWARD THE NINETIES 87 (1987).

21. The 1987 amendments to the Clean Water Act added a new section 319 to address the problem of nonpoint source pollution. 33 U.S.C. § 1329 (1988 supp.). This provision requires each state to identify navigable waters within the state where water quality standards cannot be met without control of nonpoint source pollution. 33 U.S.C. § 1329(a)(1)(A). The states must identify nonpoint sources that add significant pollution to these waters and processes

But, in spite of the creativity, the modern reform movement has achieved change only around the edges. Almost all of the reform is limited in scope and, even when it applies, usually affects only the granting of new rights. The huge mass of rights granted during the long tenure of the pure, monolithic doctrine has been little disturbed. A minimum stream flow with a 1988 priority date gets the public nothing on those many western streams where you need a priority date of 1920, or even 1880, to get wet water. On the other hand, even an ancient priority can be insufficient to guarantee social equity as against the workings of the classic doctrine. An Indian water right with a priority date of 1868 but no construction funds gets a tribe nothing when there is a competing project on the same river, built and subsidized for non-Indian farmers under the 1902 Reclamation Act. Even after fifteen years of intense reexamination and some impressive paper statutes, most wet water is still allocated to the beneficiaries of the classic prior appropriation doctrine. It is still mostly business as usual.

Thus, to achieve deep and lasting reform, we need to reform the classic doctrine, and to reform it we need to understand it.[22] In pursuit of that understanding, I have reached some basic conclusions, all elaborated upon in this article, in my research and thinking about western water law and policy. First, the commonly-stated rhetoric that the West has been colonized by outside interests is fundamentally wrong: in most areas of natural resources law and policy — whether land, minerals, timber, range, animals, or water — the federal government has been primarily a pass-through for achieving the desires of westerners. Second, and similarly, western water law is best understood, not as the domain of the states, but as the province of water interests: the states, too, have been pass-throughs for the goals of private developers. Third, the essential problem with the classic doctrine is not the interests it represents. They deserve to be represented — well-represented — in any sensible water policy. The problem is that the classic doctrine represents only those interests — it is too narrow. Because it is so tightly tailored to meet only the needs of those narrow interests, the classic doctrine never intersects with fundamental notions of economics, social equity, conservation, environmental protection, and science. Indeed, perhaps the most profound consequence of the essential failing of narrowness is that the classic doctrine is bad science. It is on precisely that point that we can learn so much from Aldo Leopold, the father of modern natural resources policy and philosophy. My last underlying conclusion is that we need to draw more parallels

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for identifying the best management practices to control these sources. 33 U.S.C. § 1329(a)(1)(B)-(C). Additionally, each state must develop a management program for controlling nonpoint source pollution, which includes the best management practices to reduce pollutant loading from the identified nonpoint sources. 33 U.S.C. § 1329(b). See also DAVIDSON, *The 1987 Nonpoint Source Pollution Amendments and State Progress Under the New Program*, in WATER QUALITY CONTROL: INTEGRATING BENEFICIAL USE AND ENVIRONMENTAL PROTECTION (Natural Resources Law Center, University of Colorado School of Law, Ninth Annual Summer Program, June 1-3, 1988).

22. When I say "the classic doctrine," I am using the term broadly to include the whole water law policy of a state, including court decisions, statutes, administrative practices, and funding mechanisms.

between water rights and the prerogatives of owners of land. The interest groups who depend upon the classic doctrine insist that their water rights be accorded a uniquely high and favored status, well above that of landowners. This preferred status is wrong, for, as I will discuss, the need of the states to control water use is at least as great as their need to control land and, in many cases, is even greater.

By criticizing central elements of prior appropriation, I am not denying its merits. Among many other things, the classic doctrine, or something much like it, was needed to open the American West. Further, by showing that western water law was created by preferred private groups, I am not casting aspersions on those people who built the structure or on their successors today. In most cases, they acted neither from malice nor greed. They promoted a particular brand of water policy simply out of their own self-interest, a set of concerns that often comported fully with society's needs in those simpler times. My point, therefore, is not that classic prior appropriation was wrong for its own time, but that much of it is wrong for this time.

In this article I will propose a different framework for allocating western water. My approach, which has antecedents in scholarly literature and government commissions throughout this century, is radical by the lights of the classic doctrine. My guess, however, is that it will make substantial good sense to public policy experts, legislators, lawyers, and citizens who are willing to take a fresh and open-minded look at our system for governing western water. The flat truth is that it is western water law and policy itself, not any reform movement, that is radical — a stark and extreme departure from the economic, environmental, and social norms that we expect to be reflected in contemporary natural resources law and policy. But before turning to a discussion of some ways in which we can take a broader view of western water, let me first turn to the rise of prior appropriation and the ways in which it was born narrow-gauged and kept narrow-gauged.

II. THE RISE OF THE CLASSIC DOCTRINE

Most westerners are familiar with the origins of prior appropriation, and with its black letter application, and there is no need to reiterate those early doctrinal developments here. Suffice it to say that courts — first in California,[23] then in Colorado,[24] then throughout the region[25] — built legal rules to fit the felt needs of the mining camps and the irrigation fields. These early decisions were common-law judging at its best. With no statutes to speak of, western courts looked where they should have looked

23. Irwin v. Phillips, 5 Cal. 140 (1855).

24. Coffin v. Left Hand Ditch Co., 6 Colo. 443 (1882).

25. *See* Clough v. Wing, 2 Ariz. 371, 17 P. 453 (1888); Drake v. Earhart, 2 Idaho 750, 23 P. 541 (1890); Mettler v. Ames Realty Co., 61 Mont. 152, 201 P. 702 (1921); Jones v. Adams, 19 Nev. 78, 6 P. 442 (1885); Stowell v. Johnson, 7 Utah 215, 26 P. 290 (1891); Moyer v. Preston, 6 Wyo. 308, 44 P. 845 (1896).

— to custom, to conditions in the field, and to economic and social needs.[26] Even in hindsight, it is fatuous to say that those 19th century courts should have reached different results or even that they should have used language much different than they did.

But those early court decisions involving small-scale, two-party disputes among miners, ranchers, and farmers were not the determining factors in the development of the classic doctrine. Rather, the key phases came later. Initially, small water users installed the court-made rules in state statutes and, importantly, in the workings of state administrative agencies. Then the big water development interests locked the classic doctrine in place nearly irrevocably through a matrix of federal projects, special district laws, and a public information campaign based on the mystique of aridity and on the unspoken, illogical premise that plagues us still: If water is scarce in the West, then it must be necessary to build projects, projects, and more projects.[27] There is no question that we needed some projects, but the big interests never allowed the West to pause and consider an opposite formulation: scarcity of water and the importance of water in the West do not call for construction; these forces call for care, for well-considered policy.

These later stages of the classic doctrine that followed the formulative court decisions began in Wyoming with Elwood Mead, who with John Wesley Powell was one of the West's visionaries of the 19th century.[28] Frustrated with Colorado's refusal to accept his proposals for state administration of water rights, Mead moved from Fort Collins to Laramie in 1888, just before Wyoming statehood, to serve as the first territorial engineer. Mead was an important figure in the constitutional convention and was the principal author of the new constitution's provisions on water.[29] Most notably, the constitution denominated water a public resource, stating that "[t]he water of all natural streams, springs, lakes or other collections of still water, within the boundaries of the state, are hereby declared to be the property of the state."[30] The 1890 constitution also mandated the creation of a Board of Control and a State Engineer.[31]

Mead drafted statutes to implement the idea that water was the property of the state.[32] Among other things, these new laws required that

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26. As stated by the court in *Irwin*, 5 Cal. at 146:

> If there are, as must be admitted, many things connected with this system, which are crude and undigested, and subject to fluctuation and dispute, there are still some which a universal sense of necessity and propriety have so firmly fixed as that they have come to be looked upon as having the force and effect of *res judicata*.

27. *See generally* P. FRADKIN, A RIVER NO MORE: THE COLORADO RIVER AND THE WEST (1981); M. REISNER, *supra* note 17; D. WORSTER, RIVERS OF EMPIRE: WATER, ARIDITY, AND THE GROWTH OF THE AMERICAN WEST (1985).

28. *See generally* R. DUNBAR, FORGING NEW RIGHTS IN WESTERN WATERS 99 et seq. (1983).

29. *Id.* at 105-7. Wyoming's constitutional water provisions are contained in WYO. CONST. art. VIII, §§ 1-5.

30. WYO. CONST. art. VIII, § 1.

31. *Id.* at § 2 (Board of Control), § 5 (State Engineer).

32. "A water right is a right to use the water of the state." WYO. STAT. § 41-3-101 (Supp. 1987). This statute was enacted on December 22, 1890.

water users could obtain rights only through a permit issued by the State Engineer.[33] In addition, the legislature established a general stream adjudication process by which the Board of Control would rule on the validity and extent of all rights in a basin, subject to judicial review by the district courts.[34]

The Wyoming idea spread. Nebraska adopted an administrative system in 1895.[35] Then there was a rash of new systems just after the turn of the century and it is revealing to see why. The element of stability guaranteed by prior appropriation was one prerequisite for getting water out of the rivers and onto the arid land, but law standing alone was insufficient. Physical structures — projects in the form of dams and conveyance systems — were also necessary. Private and even state capital was inadequate, so western water interests obtained federal financing through the great Reclamation Act of 1902.[36] But the federal government suggested a quid pro quo. Leading historian Robert Dunbar explained it this way:

> Frederick Newell, chief engineer of the new Reclamation Service, noted, "The laws of many of the States and Territories relating to water are in a more or less chaotic condition." Because of this condition, the Service in many jurisdictions was unable to determine the amount of unappropriated water available for its projects. Consequently, Newell warned that a reformation of water-right laws would be a condition for the approval of some projects. In September 1902, his superior, Charles D. Walcott, director of the United States Geological Survey, came west and told a group of farmers in Nevada that construction of reclamation projects in the state would not begin until the water rights on the major streams had been adjudicated.[37]

The diverse interests that wanted federally-financed water, most notably the land-sale promoters who had so much to gain from the massive public works projects, were not about to let the lack of organizing law stall the drive to obtain the big projects. There was a related incentive for the creation of the state water agencies. Although section 8 of the Reclamation Act proclaimed "[t]hat nothing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the [water] laws of any State or Territory,"[38] the development interests wanted to

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33. WYO. STAT. § 41-4-501 (1977). This requirement was upheld as constitutional. Wyoming Hereford Ranch v. Hammond Packing Co., 33 Wyo. 14, 236 P.2d 764 (1925).

34. WYO. STAT. §§ 41-4-301 to -408 (1977). Wyoming's adjudication system was found to be constitutional. *See* Farm Investment Co. v. Carpenter, 9 Wyo. 110, 61 P. 258 (1900).

35. "The water of every natural stream not heretofore appropriated within the State of Nebraska, including the Missouri River, is hereby declared to be the property of the public and is dedicated to the use of the people of the state, subject to appropriation." NEB. REV. STAT. § 46-202(1) (1943). Nebraska's statutes now require that a person intending to appropriate water "make an application to the Department of Water Resources for a permit to make such appropriation." NEB. REV. STAT. § 46-233(1) (1943).

36. *See generally,* Sax, *Federal Reclamation Law,* 2 WATERS AND WATER RIGHTS, ch. 8 (R. Clark, ed., 1967). McKinnon, *Water to Waste: Irrational Decisionmaking in the American West,* 10 HARV. ENVTL. L. REV. 503, 504-08 (1986).

37. R. DUNBAR, *supra* note 28, at 115-16.

38. The Reclamation Act of 1902, Pub. L. No. 161, § 8, 32 Stat. 388, 390.

be absolutely certain that control over the allocation of western water would remain in the West, not in Washington, D.C.

These motives, coupled with the suggestions of Newell and other federal officials, impelled most western states to act. Nevada, Utah, and Idaho adopted Wyoming-style administrative systems.[39] In 1905, Washington considered a closely-related model drafted by Morris Bien, although reform legislation was not enacted until 1917.[40] New Mexico Territory adopted a Bien code in 1907 and other western states took up systems based on either the Wyoming or Bien concept.[41] Nearly all states on or west of the 100th meridian had acted by 1919, when Arizona adopted its code.[42] Montana held out until 1973, when it adopted an administrative permit system.[43] Only Colorado has remained true to its original system of judicially-decreed rights, foreswearing any administrative control over the granting of water rights.

The major spurt of activity, which was nearly westwide, occurred between 1890 and 1919, and it is worthwhile to put this drive toward administrative control over water in perspective. Then, as now, westerners were conservative, especially when it came to establishing bureaucracies. All of the western states were young. The senior state, California, had entered the Union in 1851 and several did not achieve statehood until the 1880's and 1890's. Arizona and New Mexico remained in territorial status until 1912.[44] The states were also small — the rule of thumb for admis-

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39. NEV. REV. STAT. § 533.325 (1986) (requires a party desiring to appropriate water or make a change of use to apply to the State Engineer for a permit) (adopted in 1913). NEV. REV. STAT. § 533.090 (State Engineer shall determine relative rights of water claimants) (adopted in 1913). A water rights determination procedure was originally adopted by the Nevada legislature in 1903, and a permit system was adopted in 1905. These provisions were rewritten in 1913. *See* DUNBAR, *supra* note 28, at 116-17. UTAH CODE ANN. § 73-3-1 (1953) (requires application to the State Engineer for right to appropriate waters) (adopted in 1919). UTAH CODE ANN. § 73-4-1 (requires State Engineer to file in district court an action to determine water rights on a given stream when petitioned to do so by a specified number of water users on the stream) (adopted in 1919). Utah originally adopted a water code in 1903 which required a permit to appropriate water and provided for adjudication of water rights by a referee subject to judicial review. In 1919, Utah modified its adjudication procedures. DUNBAR, *supra* note 28, at 117-19, 125. IDAHO CODE §§ 42-201 to -202 (1977) (requires application to the Department of Water Resources for a permit to appropriate water) (adopted in 1903). IDAHO CODE § 42-1401 (adjudications are carried out in district court) (adopted in 1903).

40. WASH. REV. CODE § 90.03.250 (Supp. 1988) (requires application to the Supervisor of Water Resources for a permit to appropriate water) (adopted in 1917). WASH. REV. CODE §§ 90.03.110 to .245 (Supp. 1988) (water rights determinations are carried out in superior court with the Supervisor of Water Resources acting as referee) (adopted in 1917).

41. N.M. STAT. ANN. § 72-5-1 (1978) (requires application to the State Engineer for a permit to appropriate water) (adopted in 1907). N.M. STAT. ANN. § 72-4-15 (1985) (upon completion of a hydrographic survey of any stream system by the State Engineer, the Engineer is to request the Attorney General to initiate adjudication proceedings in court).

42. ARIZ. REV. STAT. ANN. § 45-152 (1987) (requires application to the Director of Water Resources for a permit to appropriate). ARIZ. REV. STAT. ANN. § 45-252 (adjudications are conducted in superior court with the Attorney General representing the state of Arizona).

43. MONT. CODE ANN. § 85-2-302 (1987).

44. The following western states were admitted to the union on the date indicated: Arizona, 37 Stat. 1728 (1912); California, 9 Stat. 452 (1850); Colorado, 19 Stat. 665 (1876); Idaho, 26 Stat. 215 (1890); Montana, 26 Stat. 1551 (1889); New Mexico, 37 Stat. 1723 (1912); Nevada, 13 Stat. 749 (1864); Oregon, 11 Stat. 383 (1859); Utah, 29 Stat. 876 (1896); Washington, 26 Stat. 1552 (1889); Wyoming, 26 Stat. 222 (1890).

sion during most of the late 19th century was 60,000 citizens.[45] Even at the federal level, administrative processes were in their infancy. It bears remembering that the 1887 creation of the Interstate Commerce Commission, the oldest of the "Big Seven" federal agencies, is considered as the dawn of the modern federal bureaucracy.[46] The FTC was not chartered until 1914 and the remaining "Big Seven" agencies were not established until the New Deal.[47] In the West, the move toward substantial administrative agencies had not even begun to emerge at the turn of the 20th century.

Not so for water, which was deemed important enough to call for its own administrative structure. But it was a unique and, by today's lights, curious kind of structure. At the outset, the nature of the laws that the agencies were charged to uphold cause a person to wonder exactly how a regulatory agency would fit in. The "first in time, first in right" rule of capture at the core of the classic doctrine was laissez faire policy in the extreme: public resources were thrown open to virtually unfettered private exploitation. Substantive water law embodied much of the Social Darwinism movement in vogue during the late 19th century.[48]

Accordingly, this governmental overlay for water was in no remote sense a regulatory scheme. The statutes setting up the water agencies made essentially no change in the underlying body of law. The new agen-

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45. This population guideline was set forth by the Congress of the Confederation in the Northwest Ordinance of 1787. P. GATES, HISTORY OF PUBLIC LAND LAW DEVELOPMENT 285 (1968). Territories were often granted statehood with less than this requisite population number. *Id.* at 308.

46. L. FRIEDMAN, A HISTORY OF AMERICAN LAW 384 (1973).

47. B. SCHWARTZ & H. WADE, LEGAL CONTROL OF GOVERNMENT 28 (1972).

48. Charles Darwin introduced his theory of natural selection to the world in his 1859 book, ON THE ORIGIN OF SPECIES. Darwin's theory is based upon the fact that there are variations among individuals of a given species and that individuals and species are in constant competition for limited resources. The result of this competition, or struggle for survival, is that the best adapted species and individuals will survive and propagate while the "inferior" species and individuals will perish; this process is known as natural selection. Soon after the publication of Darwin's theory, a movement developed in which Darwinism was used to explain the principles of social structure and change. Social Darwinism was enthusiastically embraced by conservatives of the late nineteenth century who opposed social reform. The doctrine provided a scientific basis for their laissez faire preachings. R. HOFSTADTER, SOCIAL DARWISNISM IN AMERICAN THOUGHT 46 (Beacon Paperback ed. 1955).

The most influential Social Darwinist was William Sumner. *Id.* at 51. Sumner was opposed to state regulation and control of individual decisionmaking. The concept of vested private property rights was dearly held by the Social Darwinists. State interference with these property rights was viewed as antithetical to evolution:

> Liberty means the security given to each man that, if he employs his energies to sustain the struggle on behalf of himself and those he cares for, he shall dispose of the product exclusively as he chooses. It is impossible to know whence any definition or criterion of justice can be derived, if it is not deduced from this view of things; or if it is not the definition of justice that each man shall enjoy the fruit of his own labor and self-denial, and of injustice that the idle and the industrious, the self-indulgent and the self-denying, shall share equally in the product. Aside from the a priori speculations of philosophers who have tried to make equality an essential element in justice, the human race has recognized, from the earliest times, the above conception of justice as the true one, and has founded upon it the right of property.

W. SUMNER, SOCIAL DARWINISM: SELECTED ESSAYS OF WILLIAM GRAHAM SUMNER 75 (1963).

cies existed solely for the purposes of issuing water rights according to the laissez faire doctrine, and, after issuance, for enforcing the rights of record. Despite statutory protestations against waste, state engineers left the use of water after diversion to the rights holders, so long as the water was put to one of the specified beneficial uses.[49]

Thus, the mission of the water agencies was to serve the bidding of rights holders of record. Government was enlisted purely to enforce private rights to a public resource. These were captured agencies in the most extreme sense. Consider, for example, this general description of captured agencies and apply it to western water agencies:

> "Traditional" regulation . . ., e.g., the alphabet federal independent regulatory commissions, involves controls directed by a public regulator on the private sector. Criticism of regulatory performance has often included the observation that, in practice, the direction of interference or control is opposite . . .; regulatory outputs tend to correspond to the interests of the regulated party rather than those specified in the formal regulatory . . . legislation. Thus such "capture" could be understood as a kind of reverse regulation.[50]

Again, it may be, even in retrospect, that this model was well-suited to a particular resource issue at a particular time. The problem is that the judicially announced substantive law formulated in 1855 and the administrative systems conceived in 1890 remained locked in place for 120 and 80 years respectively, until about the mid-1970's. A static body of law sometimes can be good, sometimes bad. But when it is inexorably churning out private rights to a public resource, with handmaiden agencies serving the bidding of the private rights holders, there ought to be some mechanism for public review and modification. Elwood Mead, so imbued with the public welfare,[51] saw his system as the right one for

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49. *See generally* Pring & Tomb, *License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West*, 25 ROCKY MTN. MIN. L. INST. 25-1 (1979); Shupe, *supra* note 5.

50. B. MITNICK, THE POLITICAL ECONOMY OF REGULATION 14 (1980). The "capture theory" was popularized by consumer advocates who criticized the performance of regulatory agencies on the ground that the agencies had been "captured" by the very firms they were supposed to regulate. Regulatory officials were portrayed as industry-oriented, as unwilling to jeopardize their post-government careers by being too tough, or as gradually co-opted by informal contacts with representatives of regulated firms. *See generally* J. FREEDMAN, CRISIS AND LEGITIMACY 58 (1978).

51. Discussing the control canal companies had over water resources under existing water laws, Mead stated:

> Six hundred years ago when a king of France wanted to reward a noble, he gave him the waters of a stream. Today for the Noble, who was a man and could be reached and treated as such, we have substituted that pulpy individuality called a corporation and have said here is a fertile and bounteous land: the ditch which provides its water supply holds the key to its value. Build the ditch; the water you can have for nothing, and at the same time virtually own the land. The way is open; make all you can . . . .
>
> The history of irrigation in Europe gives illustration after illustration of the fact that a system which permits such ownership always leads to extortion and suffering, and unless changed, sooner or later ends in anarchy or agricultural prostration.

Wyoming in 1890. One can fairly doubt whether a person of Mead's stature would expect any single approach to be cemented in place for nearly a century.

III. THE PRINCIPAL WEAKNESSES OF THE CLASSIC DOCTRINE

The water agencies began as captured agencies and, even with the beginning stirrings of reform, they remain captured agencies. Their principal business remains the protection and advocacy of rights granted according to the strictures of the classic doctrine. Again, I recognize that the old laws have accomplished many things. But, as of the late 1980's, there is no longer any doubt that the classic doctrine has fundamental weaknesses and that they must be addressed by an accelerated reform movement.

The basic problem with the classic doctrine is the insular nature of the water allocation decisionmaking process. Decisions are made by those who want to capture water, without any comprehensive analysis of the external impacts. This one-dimensional approach to water resource management causes unsound decisionmaking when viewed in the broader context of sustainable watershed management. Let me catalogue some of the specific problem areas.

A. Economics

The classic doctrine is bad economics. Those water users favored by the classic doctrine have been quadruply subsidized. First, as has been extensively documented, the federal reclamation program has provided literally billions of dollars of subsidies to users.[52] Second, the states have subsidized private water development through the mechanism of special water districts. Most of these districts, which number nearly 1,000 in the eleven western states, have the authority to issue tax-exempt bonds and to tax all land within their boundaries, even land that does not receive benefits from the districts.[53] Most of the districts serve private agricul-

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(Quoted in Wyoming State Engineer, 26th Biennial Report, 1941-42, 83-84 (1942).).

> I believe that any system which puts the values of a farm at the mercy of a corporation, whether its headquarters be in London or at home, is certain to work hardships and injustice, and because under no circumstances should an article, which belongs to all alike, and comes as a gift from the bounty of Nature, be made a subject of barter and sale.

Id. at 87.

52. *See generally* NATIONAL WATER COMMISSION, WATER POLICIES FOR THE FUTURE 145-47 (1973); Sax, *Selling Reclamation Water Rights: A Case Study in Federal Subsidy Policy*, 64 MICH. L. REV. 13 (1965); Ellis & DuMars, *The Two-Tiered Market in Western Water*, 57 NEB. L. REV. 333 (1978); Wilson, *Reclamation Subsidies and Their Present-Day Impact*, 1982 ARIZ. ST. L.J. 497. During the late 1970's and 1980's, Congress, looking to the budgetary and environmental costs of reclamation projects, has cut back the reclamation program and has funded no new starts. *See supra* note 17.

53. *See, e.g.*, IDAHO CODE § 43-322 (1977) (Board of Directors of irrigation districts have power to issue bonds up to a certain value depending upon the size of the district), IDAHO CODE § 43-701 (allows the levy of taxes on lands within the district), MONT. CODE ANN. § 85-7-2101 (1987) (Board of Irrigation district has power to levy special taxes upon lands in the district to pay bonds and the interest due thereon), et. seq. for other taxes, MONT. CODE ANN. §§ 85-7-2001 to -2041 (district may issue bonds under certain limitations).

tural purposes and use their tax-exempt status to promote reclamation projects, to build them, and, not so incidentally, to lobby against changes in the state and federal water laws that benefit water development interests. Professor John Leshy has said this:

> In the modern era . . . the basic rationale underlying the governmental status accorded special water districts has quietly shifted in many cases from an internal institutional need for enforced participation and cooperation by affected landowners to a desire for the financial benefits of tax-exempt status. It is little wonder, then, that one special water district attorney rhapsodized in these terms: "There can be no doubt that the discovery of the legal formula for these organizations was of infinitely greater value to California than the discovery of gold a generation before."[54]

A third way in which the classic doctrine subsidizes water rights holders is by ignoring the costs of the externalities imposed on others. The most notable externalities are those imposed upon downstream users and upon recreationists on the rivers when streams are depleted or polluted by run-off.[55]

The fourth major source of subsidies is little-mentioned but it is the most sweeping and perhaps involves the greatest financial value of all. Under the classic doctrine, water users obtain the right to use public water

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54. Leshy, *Special Water Districts-The Historical Background*, in SPECIAL WATER DISTRICTS: CHALLENGE FOR THE FUTURE 11, 22 (J. Corbridge, Jr. ed. 1985) (quoting Henley, *The Evolution of Forms of Water Users Organizations in California*, 45 CALIF. L. REV. 665, 667 (1957)). Special water districts deliver approximately one-half of all western water, some of it supplied to them by the Bureau of Reclamation. State laws allow most special districts to issue tax-exempt bonds. Voting rights and other aspects of participation in district activities are often based on acreage ownership (one acre, one vote), even when district boundaries reach into urban areas. With voting weighted toward irrigation interests, the districts are able to promote and fund projects, encourage investment through the use of tax-exempt bonds, provide subsidized water primarily for irrigation, and obligate all persons residing within the district boundaries. A requirement that directors of the Imperial Irrigation District must be landowners was struck down in California. Choudhry v. Free, 17 Cal. 3d 660, 552 P.2d 438, 131 Cal. Rptr. 654 (1976). The weighted voting structure of the Salt River Project in Arizona, however, has withstood constitutional challenges. Ball v. James, 451 U.S. 355 (1981). Justice White accurately analyzed the effects of these voting provisions:

> It is apparent in this case that landowning irrigators are getting a free ride at the expense of the users of electricity. It would also seem apparent that except for the subsidy, utility rates would be lower. Of course, subsidizing agricultural operations may well be in the public interest in Arizona, but it does not follow that the amount of the subsidy and the manner in which it is provided should be totally in the hands of a select few.

Id. at 384 (White, J. dissenting). On special water districts, *see generally* SPECIAL WATER DISTRICTS: CHALLENGE FOR THE FUTURE, *supra*; Leshy, *Special Project: Irrigation Districts*, 1982 ARIZ. ST. L.J. 345.

55. An "externality" is an unintended cost imposed on, or unintended benefit received by, parties external to a given market transaction. Krutilla, *Reflections on Man's Relation to Nature*, in NATURAL RESOURCES ECONOMICS AND POLICY APPLICATIONS: ESSAYS IN HONOR OF JAMES A CRUTCHFIELD 3 (1986). When water is diverted from a stream without consideration of the effects beyond the potential injury to senior rights holders, negative externalities often are imposed upon humans and wildlife that receive benefits from the water as it flows in the stream. For other possible externalities, *see infra* text accompanying note 66. Since many of these actual costs are not figured into the allocation decisionmaking process, the appropriator is, in effect, subsidized by the parties who ultimately must bear these costs.

without charge. This is nearly unique in public resource law and policy. To take just a few examples, users must pay some charge for using federal or state timber, grazing land, energy minerals, and even wildlife. There is no charge, however, imposed by any government for the use of water. The only parallel is with hard rock minerals on public lands where the General Mining Law of 1872[56] requires no payment of royalties to the United States — a statute, by no mean coincidence, that arose out of the same mining camps and the same era that produced the classic prior appropriation doctrine.

Let me make my point plain. I understand that water development involves costs, often extraordinary costs, especially when major dams or transmountain diversions are involved. But there is no payment to the government for the use of the water. With the exception of the Hard Rock Act, all extractive users of public resources must pay both development costs and some charge to the government for the use of the resource: timber companies must build their roads and haul their logs, and also pay a stumpage fee;[57] ranchers must put up fences and construct stock ponds, and also pay a grazing fee;[58] oil and gas companies must pay for their drilling rigs and their roads, and also pay a royalty.[59] But there is no charge for water.

Clearly, there are times when subsidies are a valid component of government policy. Most notably, private market mechanisms sometimes fail to meet public interest goals or to serve unorganized, broad-based classes of beneficiaries. Some examples are government funding of mass transit, the arts, and parks. Thus, the problem is not subsidies per se, but rather it is irrational or unexamined subsidies. While subsidies to promote development of irrigation facilities to secure westward expansion may have served the public interest at the turn of the century, the subsidies have gone too far and benefit a very limited interest group. Such policies ought to be examined in light of the public interest as it stands at the end of the 20th century.

B. The Rights of Other Governments

A second broad weakness of the classic doctrine is that it does not respect the rights of other governments. From the beginning, rights under prior appropriation have been granted in square deprivation of the water

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56. Act of May 10, 1872, ch. 152, § 1, 17 Stat. 91 (codified as amended at 30 U.S.C. §§ 22-42 (1982)).

57. *See* 16 U.S.C. § 472a (1982).

58. 43 U.S.C. § 315b (1982) (parties are "entitled to participate in the use of the range, upon the payment annually of reasonable fees . . . ."). 43 U.S.C. § 315c (allows permit holders to make improvements on grazing land at own expense).

59. For example, in areas of known oil and gas deposits, the drilling party must bid for the oil and gas lease. The highest bidder receives an oil and gas lease and must pay the amount of its bid up front as a bonus to the government. This party must also pay a royalty to the government which may not be less than 12.5% of the value of the production removed. 30 U.S.C. § 226(b) (1982). The lease holder must also pay an annual rental fee of not less than 50 cents an acre. *Id.* at § 226(d).

rights of Indian tribal governments.[60] Similarly, the classic doctrine is so insular that it fails to account for the rights of other states and foreign governments, mainly Mexico. States simply whir out new rights without regard to other jurisdictions, leaving them with no recourse other than unwieldy litigation in the Supreme Court or the vagaries of negotiations for interstate compacts or international treaties.[61]

Until recently the reserved rights of the federal government have had less support in the case law than the rights of Indian tribes, states, and foreign nations. Today, however, the existence of federal reserved rights is considerably more clear, even if the extent of such rights may be in considerable doubt in specific situations.[62] Nevertheless, the state agencies, working on behalf of their patron private rights holders, fight federal reserved rights tooth-and-nail at nearly every turn, regardless of the fact that federal instream rights will often be of real benefit to the burgeoning recreational economy in the West. But the classic doctrine is a closed system and not structured to account for such considerations. Nobody ever put it better than Bernard DeVoto when he described the attitude of western water interests toward the federal government: "Get out and give us more money."[63]

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60. Although federal reserved water rights for Indian reservations were recognized early in this century (*see* Winters v. United States, 207 U.S. 564 (1908)), they have seldom been considered when granting rights under the state prior appropriation systems.

> Following *Winters*, more than 50 years elapsed before the Supreme Court again discussed significant aspects of Indian water rights. During most of this 50-year period, the United States was pursuing a policy of encouraging the settlement of the West and the creation of family-sized farms on its arid lands. In retrospect, it can be seen that this policy was pursued with little or no regard for Indian water rights and the *Winters* doctrine. With the encouragement, or at least the cooperation of the Secretary of the Interior — the very office entrusted with protection of all Indian rights — many large irrigation projects were constructed on streams that flowed through or bordered Indian Reservations, sometimes above and more often below the Reservations. With few exceptions the projects were planned and built by the Federal Government without any attempt to define, let alone protect, prior rights that Indian tribes might have had in the waters used for the projects . . . . In the history of the United States Government's treatment of Indian tribes, its failure to protect Indian water rights for use on the Reservations it set aside for them is one of the sorrier chapters.

NATIONAL WATER COMMISSION, WATER POLICIES FOR THE FUTURE 474-75 (1973).

61. This problem is evident in the conflicts involving allocation of the Colorado River. In 1944 the United States entered a treaty with Mexico guaranteeing the delivery of 1,500,000 acre-feet of water annually. Due to excessive diversions and agricultural runoff, the water reaching Mexico became so highly saline that Mexico began experiencing severe crop losses. The 1944 Treaty provided no guarantees as to the quality of water to be delivered to Mexico. After extensive negotiations, an agreement was reached whereby the United States agreed to limit the salinity of water delivered to Mexico. This was finally implemented in 1974 with the passing of the Colorado River Basin Salinity Control Act and the construction of a multi-billion dollar desalinization plant. *See* T. MILLER, G. WEATHERFORD & J. THORSON, THE SALTY COLORADO (1986).

62. *See generally* Leshy, *Water and Wilderness/Law and Politics*, 23 LAND & WATER L. REV. 389 (1988); Tarlock, *Protection of Water Flows for National Parks*, 22 LAND & WATER L. REV. 29 (1987).

63. *Quoted in* W. STEGNER, THE AMERICAN WEST AS LIVING SPACE 9 (1987).

C. Excluded Policy Objectives

Third, the classic doctrine ignores widely-accepted policy objectives. First and foremost is the conservation of water which, if pursued properly, is a major source of "new" western water that can obviate the need for many structural solutions. There are disagreements about the definition of water waste but, by any standard, western water users are extraordinarily inefficient. The best example is agriculture, which consumes about ninety percent of all western water. On a westwide basis, only forty-one percent of diverted water is consumed by the crops, while forty-six percent returns to the stream as return flow and thirteen percent is lost to the system through consumption by phreatophytes or seepage into impervious formations.[64] The thirteen percent of diverted water lost to the system may sound insignificant but, according to a Soil Conservation Service study, on a westwide basis it amounts to twenty-four million acre-feet per year, nearly twice the annual flow of the Colorado River.[65]

Private interests often attempt to explain away inefficient practices by arguing that much of the diverted water is not wasted, but rather becomes return flow. Those arguments, however, do not comport with contemporary knowledge about whole river systems. When excess water is diverted from a stream, the return flows will usually cause stream temperature to rise, producing negative effects on fishlife. Further, return flows are laden both with natural soils and salts and with agricultural chemicals, causing a number of serious problems discussed later in this article.[66] Inefficient uses in agriculture, in the cities, and in industry must be corrected by sensitive, phased-in, comprehensive conservation programs.

The second policy objective ignored by the classic doctrine is the maintenance of instream flows. A majority of western states now recognize instream flows in some fashion, but the programs have had little impact on the streams because the rights are so junior.[67] Much broader reform is needed before western states will have balanced programs in which instream flows are given their due.

Last, the classic doctrine ignores planning as a mechanism for creating water policy. The forces behind laissez faire appropriation of water have managed to keep down nearly any semblance of water planning, even though our society has long become accustomed to land-use planning. If

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64. INTERAGENCY TASK FORCE REPORT, IRRIGATION WATER USE AND MANAGEMENT 22-23 (1979).

65. U.S. SOIL CONSERVATION SERVICE, CROP CONSUMPTIVE IRRIGATION REQUIREMENTS AND IRRIGATION EFFICIENCY COEFFICIENTS FOR THE UNITED STATES (Appendix to the NATIONAL ANALYSIS, SECOND NATIONAL WATER ASSESSMENT) 17 (1976). The Departments of Interior and Agriculture and the Environmental Protection Agency reached a similar conclusion, finding a loss of 21.1 million acre-feet. INTERAGENCY TASK FORCE REPORT: IRRIGATION WATER USE AND WATER 22-23 (1979). Both estimates are for irrecoverable losses to the stream systems.

66. *See, e.g.*, THE CONSERVATION FOUNDATION, STATE OF THE ENVIRONMENT: AN ASSESSMENT AT MID-DECADE 105-28 (1984). *See infra* notes 71-77.

67. *See supra* note 16.

anything, the case for water planning is even stronger than for land planning because water is a moving resource and a project can have impacts on other citizens and property dozens or even hundreds of miles away.

D. Science

Finally, the classic doctrine is bad science. Most state systems still separate groundwater and surface water even though most groundwater and surface water are hydrologically connected.[68] Most states separate water issues and wildlife issues, so that consumptive water use is treated in isolation from biologically intertwined issues of wildlife habitat.[69]

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68. *See generally* R. FREEZE & J. CHERRY, GROUNDWATER (1979). *See also* Haase, *The Interrelationship of Ground and Surface Water: An Enigma to Western Water Law*, 10 SW. U.L. REV. 2069 (1978). In Grant, *The Complexities of Managing Hydrologically Connected Surface Water and Groundwater Under the Appropriation Doctrine*, 22 LAND & WATER L. REV. 63 (1987), the author points out that all of the western appropriation states have statutory means for integrating the administration of hydrologically connected surface and groundwater rights; however, with few exceptions, the states have not put these into practice. *Id.* at 65.

69. Consumptive water use has many direct effects on wildlife, especially fisheries. Many stream organisms are adapted to specific flow velocities, depths, temperatures, and fluctuations in flow; thus, changes in stream flow have multiple effects on the fishery resource. D. ALLARDICE, G. RADOSEVICH, K. KOEBEL & G. SWANSON, WATER LAW IN RELATION TO ENVIRONMENTAL QUALITY (Completion Report 55, Office of Water Resources Research, U.S. Dep't of the Interior, 1974). Low flows may cause migration barriers for anadromous fish, and low spring and summer flows may delay the onset of migration. *Id.* at 112-13. Many fish have narrow tolerances to velocity and depth when choosing spawning areas due to specific requirements for aeration of eggs, fertilization and juvenile fish mobility. *Id.* at 114. In addition, current velocity affects the substratum quality, and periods of high flow are necessary for cleansing siltation from streambeds which is important in creating good spawning habitat. *Id.* at 122. Stream insects, an important food source for many fish, are adapted to specific current environments. *Id.* at 116. Availability of specific fisheries' habitat types has been correlated with stream flow. Carter, Valdez, Ryel & Lamarra, *Fisheries Habitat Dynamics in the Upper Colorado River*, 3 J. OF FRESHWATER ECOLOGY 249 (1985).

Conversely, wildlife habitat such as forests and riparian areas has a direct effect on the quantity of water in a stream system. Forests are major water consumers due to evaporation of water intercepted by the canopy and transpiration losses. Hamilton & Pearce, *Biophysical Aspects in Watershed Management*, in WATERSHED RESOURCES MANAGEMENT 33, 42 (1986). It has been estimated that clearing of all riparian vegetation in Arizona would increase the state's water supply 15-35%. Fox, *Importance of Riparian Ecosystems: Economic Considerations*, in IMPORTANCE, PRESERVATION AND MANAGEMENT OF RIPARIAN HABITAT: A SYMPOSIUM 20 (USDA FOREST SERVICE GENERAL TECHNICAL REPORT RM-43, 1977). Under a one-dimensional approach to water management, i.e., looking solely to maximize the quantity of water available for diversion, these facts might mandate a policy of clear-cutting all areas adjacent to streams. However, there are several countervailing considerations when viewing water management in a broader context: water quality is generally highest from forested lands; forests use this water to produce useful products, including environmental and aesthetic benefits; and other land uses may not be sustainable on many areas where forests are present. Hamilton & Pearce, *supra* at 42.

Riparian vegetation provides cover for fish, protecting them from predators and allowing them to conserve energy due to reduced stream velocities. D. ALLARDICE, *supra* at 123. Riparian and wetland areas also provide important habitat for a wide diversity of wildlife. *See, e.g.*, Stevens, Brown, Simpson, & Johnson, *The Importance of Riparian Habitat to Migrating Birds*, in IMPORTANCE, PRESERVATION AND MANAGEMENT OF RIPARIAN HABITAT: A SYMPOSIUM 156 (USDA Forest Service Technical Report RM-43, 1977). Leaves and organic debris that fall into the stream may be an important energy source for organisms at the bottom of the stream food chain.

Riparian vegetation also plays a crucial role in water quality. Such vegetation may play

Perhaps most fundamentally of all, the law has artificially distinguished between water quantity and water quality.[70] This is true for point source pollution, but the problem is even more severe for non-point source pollution.

Sediment is the major polluting agent in this country: "In terms of volume, it exceeds all other sources of pollution combined...."[71] As several leading authorities have concluded, "Erosion and subsequent silt deposition is one of the most serious consequences of these man-made alterations within watersheds."[72] Sediment movement has adverse effects at its source (loss of nutrients and moisture-storage capacity), in transit (increased cost of water treatment and decreased water quality), and at the site of deposition (in the form of filled reservoirs).[73]

Aldo Leopold was acutely aware of the problem of soil erosion and defined it as "a leprosy of the land" which could be cured only by "the universal reformation of land use."[74] In what is thought to be the first

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a significant role in influencing the water temperature of certain stream banks and reducing erosion. In addition, riparian vegetation serves as a buffer between stream waters and surrounding lands and acts as a filter for run-off. Petersen, Madsen, Wilzbach, Magadza, Paarlberg, Kullberg & Cummins, *Stream Management: Emerging Global Similarities,* 16 AMBIO 166 (1987) [hereinafter Petersen]. Given the close biophysical ties between water quantity and quality and wildlife habitat, a management decision involving one must consider the effects on the other.

70. Water quantity and quality are intimately related. A reduction in the quantity of water can have an adverse effect on the quality of the water by reducing the dilutive effect of the flow. Likewise, a decrease in water quality can reduce the quantity of water available for human consumptive use and make use of the water more expensive due to added purification costs.

> Almost all extractions of water contribute to water quality degradation by (1) reducing the quantity of water in the stream and, thus, its assimilative capacity; (2) leaching natural salts, selenium, or other chemicals from the soil that accumulate in return flows; or (3) assimilating pesticides, herbicides, fertilizers, and other polluting agents in return flows. Thus, individual extractions, although not necessarily significant in themselves, cumulatively reduce water quality.

Johnson, *The Emerging Recognition of a Public Interest in Water: Water Quality Control by the Public Trust Doctrine,* in WATER AND THE AMERICAN WEST: ESSAYS IN HONOR OF RAPHAEL J. MOSES 128, 133 (1986).

71. D. SATTERLUND, WILDLAND WATERSHED MANAGEMENT 256 (1972).

72. D. ALLARDICE, *supra* note 69, at 138 (referring to man-made alterations such as highway construction, logging, stream impoundment, channelizing, and dredge and fill activities).

73. D. SATTERLUND, *supra* note 71, at 173. Many polluting chemicals found in agricultural run-off are attached to soil particles; thus, agricultural practices that cause high soil loss also increase the volume of these pollutants in the stream systems. Davidson, *Little Waters: The Relationship Between Non-Point Source Water Pollution, Soil Erosion and Agricultural Drainage,* in WATER RESOURCES LAW: PROCEEDINGS OF THE NAT'L SYMPOSIUM ON WATER RESOURCES LAW 180-81 (1986). Therefore, soil erosion resulting from agricultural practices:

> directly damages waters by, for example, directly damaging fish and other wildlife habitat and their food supplies. Indirectly, sediment causes damage by carrying nutrients and pesticides from fields into bodies of surface water. In the long haul it may be the presence of fertilizers, agricultural chemicals, and trace elements attached to the sediment that makes agricultural drainage a major source of water pollution.

Id. at 181.

74. Leopold, *Conservation Economics,* 32 J. FORESTRY 537, 539 (1934).

statement by a member of the forestry profession calling attention to the soil erosion problems of the river valleys of the arid Southwest, Leopold pointed out that "[s]oil is the fundamental resource, and its loss the most serious of all losses."[75] Leopold was also aware of the multiple adverse effects of erosion: "remember also that erosion of soil is always accompanied by disturbance or damage to the usable water supply."[76]

The two major sources of erosion, agriculture and grazing, have obvious direct relationships to water policy, but three other leading causes of erosion — timber harvesting, roads, and construction — also need to be considered in their aggregate. As an example, researchers in British Columbia have concluded that logging and related activities have had a greater impact on Pacific salmon stocks than any other single source of habitat damage.[77]

The classic doctrine does not consider non-point pollution or allow decisionmaking by whole watersheds. Rather, individual appropriators make the decisions one by one, with the water agencies serving as pass-throughs to certify those laissez faire decisions. Even in those states where reviews of new proposals have taken on a somewhat more comprehensive cast, western watercourses are still governed by the accumulated weight of more than a century of past private decisions, all made in isolation.

IV. THE RELEVANCE OF ALDO LEOPOLD'S WORK

Aldo Leopold's name has seldom appeared in the annals of water law and policy. This omission makes a powerful statement about the essential nature of the classic doctrine because Leopold is so preeminent in natural resources policy and philosophy. Only Muir, Pinchot, Thoreau, and Carson can even arguably be accorded equal status and my sense is that Leopold's stature has become so great in recent years that his influence transcends even those other major influences. Although most of Leopold's work did not deal with water management policy per se, his advocacy of a land ethic — a comprehensive ecological approach to natural resources management and land-use practices — expressly encompasses water. Leopold's thinking is directly applicable to water management reform.

Leopold was born in 1887, at about the time that Elwood Mead was moving from Colorado to Wyoming. As a youth, Leopold was introduced to the outdoors by his father, who held a deep respect and love for nature. With Theodore Roosevelt in the White House, Leopold decided to pursue

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75. Leopold, *Erosion As a Menace to the Social and Economic Future of the Southwest*, 44 J. FORESTRY 627, 630 (1946). This paper was originally presented by Leopold in 1922 at a meeting of the New Mexico Association for Science.

76. *Id.*

77. P. Pearse, *Turning the Tide: A New Policy for Canada's Pacific Fisheries*, THE COMMISSION ON PACIFIC FISHERIES POLICY FINAL REPORT 20 (1982).

a career in the relatively new field of forestry.[78] In 1909, he graduated with a master's degree in forestry from Yale University, where the Gifford Pinchot family had established the first successful forestry program in the country.[79]

Upon graduation, Leopold joined the Forest Service and by 1912 was named the Forest Supervisor of the Carson National Forest in New Mexico. He held a variety of other positions in the Service and worked as an independent consultant before accepting a position as Professor of Game Management at the University of Wisconsin in 1933. Among many other things, Leopold specialized in wildlife management (he was an avid hunter) and was the driving force in establishing the first wilderness area in world history in 1924, when the Forest Service created the Gila Wilderness Area.[80]

Leopold was a prolific writer — he eventually published over 300 articles — but he is best known for two major pieces. The first was his classic 1933 text, Game Management,[81] which integrated the basic work of others on animal ecology with his own experiences and observations. His greatest book was a collection of essays, A Sand County Almanac,[82] which was published posthumously in 1949 and was the culmination of some sixteen years of writing. A Sand County Almanac, which has sold more than a million copies, is perhaps the single most respected work ever published on the subject of natural resources policy and philosophy. In it, Leopold weaved together a series of essays that, in total, articulated his land ethic. The book is doubly powerful because it is highly personal, with most of the essays being based on his own experiences, perceptions, and mistakes.

Perhaps Leopold's most significant contribution to the field of natural resources management was his utilization of scientific justifications for his proposed land ethic.[83] Through the tool of ecology, Leopold came to understand the interconnectedness of plant and animal species and their

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78. For a thorough biographical discussion of Aldo Leopold, *see* C. MEINE, ALDO LEOPOLD: HIS LIFE AND WORK (1988). *See also* S. FLADER, THINKING LIKE A MOUNTAIN: ALDO LEOPOLD AND THE EVOLUTION OF AN ECOLOGICAL ATTITUDE TOWARD DEER, WOLVES, AND FORESTS (1974); Meine, *Aldo Leopold's Early Years*, in COMPANION TO A SAND COUNTY ALMANAC 17-39 (J. Callicott ed. 1987).

79. Cornell actually established the First American School of Forestry in 1898, but it was soon disbanded due to political controversy. C. MEINE, *supra* note 78 at 76.

80. *See* Meine, *supra* note 78, at 31.

81. A. LEOPOLD, GAME MANAGEMENT (1933). Leopold provided readers of this book of scientific management techniques with a philosophical framework when applying the sciences to resource management:

> We of the industrial age boast of our control over nature. Plant or animal, star or atom, wind or river — there is no force in earth or sky which we will not shortly harness to build "the good life" for ourselves.
>
> But what is the good life? Is all this glut of power to be used for only bread-and-butter ends? Man cannot live by bread, or Fords, alone. Are we too poor in purse or spirit to apply some of it to keep the land pleasant to see, and good to live in?

Id. at vii.

82. A. LEOPOLD, A SAND COUNTY ALMANAC (Ballantine Books ed. 17th printing 1980).

83. Stegner, *The Legacy of Aldo Leopold*, in COMPANION TO SAND COUNTY ALMANAC 233, 235-36 (J. Callicott ed. 1987).

environments. "The only sure conclusion is that the biota as a whole is useful, and biota includes not only plants and animals, but soils and waters as well."[84] Leopold believed that all ethics were based upon the conceptualization that the individual is a member of a community of interdependent parts.[85] Based on an ecological understanding of human dependence upon the environment, the "land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land."[86] Acting in accord with Leopold's land ethic "changes the role of homo sapiens from conqueror of the land-community to plain member and citizen of it."[87] Thus, pure economic utility is no longer the sole factor determining resource decisions. Such decisions must be guided by an evaluation of the effects a given course of action will have on the integrity of the ecological community.[88] Leopold felt that the adoption of such "a land ethic, or some other force which assigns more obligation to the private landowner" was a necessary element in any scheme to improve the poor land-use practices so prevalent during his time.[89]

Leopold's writing in A Sand County Almanac has become a little bit like Shakespeare: there is a triteness to it because we have heard it all before. Thus we have been inculcated with the wisdom of phrases such as "To keep every cog and wheel is the first precaution of intelligent tinkering,"[90] and Leopold's maxim that "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."[91] It sends a chill up many of our spines to be reminded of the green fire that was dying in the eyes of the old wolf that Leopold had shot in the Arizona mountains or of the green lagoons of the now-dry Colorado delta that El Tigre, the giant jaguar, once prowled but that have now been made safe for cows.

All of those ideas and passages, and others, help set a context for water law and policy, but another concept of Leopold's strikes me as especially applicable to the classic doctrine of prior appropriation. He described Darwin as being too lineal — for Leopold, Darwinism was essentially a study of parallel plant and animal species, each of which was analyzed in isolation of the others. Leopold then said this:

> To learn the hydrology of the biotic stream we must think at right angles to evolution and examine the collective behavior of biotic materials. This calls for a reversal of specialization; instead of learning more and more about less and less we must learn more and more about the whole biotic landscape.
>
> Ecology is a science that attempts this feat of thinking in a plane perpendicular to Darwin.[92]

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84. Leopold, *A Biotic View of the Land*, 37 J. FORESTRY 727 (1939).
85. LEOPOLD, *supra* note 82, at 239.
86. *Id.*
87. *Id.* at 240.
88. *Id.* at 262.
89. *Id.* at 250. *See also infra* notes 163-67 and accompanying text.
90. Leopold, *supra* note 82, at 190.
91. *Id.* at 262, discussed *infra* note 125.
92. *Id.* at 189.

The classic doctrine presents exactly the same problem. Prior appropriation is isolated and lineal. It runs parallel to other crucial fields that ought to be integrated into considerations of water quantity. Those other fields include water quality; fish and wildlife; economics; conservation; local land use planning; Indian and federal rights; and soil conservation, both on private and federal lands. As Aldo Leopold would put it, water policy ought to be a perpendicular plane that cuts across all of those things.

V. REFORMING THE CLASSIC DOCTRINE

The following are some of the basic elements that Aldo Leopold might recommend for a sound comprehensive water system. I deliberately paint these proposals broadly for a number of reasons. These are complicated matters and it would be presumptuous to suggest all of the specific answers. Further, these issues are often state-specific and watershed-specific so that individualized approaches need to be crafted on the ground. Nevertheless, I hope that these formulations will be of some use by setting a general context and process that can foster local solutions.

A. Comprehensive Watershed Resource Planning

Water policy ought to be made through future-looking comprehensive planning designed to achieve a broad range of public and private objectives. The rough outlines of integrated watershed planning with respect to the water resource are these. First, regardless of which government actually issues a particular water right permit, all jurisdictions within a watershed should cooperate and act in a reasonably coordinated way. Second, the jurisdictions should develop an inventory of water supplies, existing uses, and potential uses. Third, future water uses should be prioritized after open public hearings. Thus choices should be made, for example, as to the amount of water to be allocated to domestic, commercial, and instream uses and as to the degree of water pollution that will be tolerated. Last, the plan must be implemented, monitored, and, if appropriate, amended. The plan must remain sufficiently flexible to accommodate socio-economic changes in the region and to incorporate new inventory and ecological data as it becomes available. Planning thus puts brakes on consumptive water development by bringing all proposals under one roof, analyzing them together, and assessing the proposed uses against available supplies. If water is not available under the plan, "new" water must be created by conservation or transfer from existing uses; the plan must be amended; or development must be foregone.

Any fashion of water planning is bitterly opposed by most western water interests, but it is hardly a new concept.[93] Both Elwood Mead and John Wesley Powell believed in water planning.[94] Comprehensive river basin planning has been advocated intermittently in this country since

93. *See generally* G. WHITE, STRATEGIES OF AMERICAN WATER MANAGEMENT (1969).

94. *See supra* notes 28-34 and accompanying text; J. POWELL, REPORT ON THE LANDS OF THE ARID REGION OF THE UNITED STATES WITH A MORE DETAILED ACCOUNT OF THE LANDS OF UTAH (1962).

the administration of Theodore Roosevelt.[95] Roosevelt strongly advocated comprehensive management of stream systems, and in 1907 he appointed the Inland Waterways Commission to make a study of water resources utilization and "evolve a comprehensive plan designed for benefit of the entire country."[96] In 1912, the congressionally created National Waterways Commission issued its final report and concluded that "[w]ith the increasing unity of our national life and the growing necessity of securing for human needs the maximum beneficial use of the waters of every stream, it will become increasingly necessary to treat every stream with all its tributaries as a unit."[97]

The Depression of 1929 brought a series of government development programs based on basin-wide planning in an effort to stimulate economic recovery.[98] Out of this era came the Tennessee Valley Authority Act of 1933, which created a government corporation to plan, construct, and operate multi-purpose projects in the Tennessee River Basin.[99] The emphasis of the TVA during this time was on development, and ecological concerns were seldom considered.[100] The TVA model was based on centralized federal control over resource development and opposition to expanded federal control has prevented the expansion of the TVA basin authority model to other river basins.[101]

In the 1950's and 1960's, strong support for basin-wide planning in the development of water resources continued.[102] However, the proposed framework during this era entailed coordinated efforts by federal and state agencies.[103] In 1950, the President's Water Resources Policy Commission issued an insightful three-volume report based upon studies of ten river basins.[104] The Commission concluded that in order for natural resources to make their greatest contribution to the welfare of the people, water resource development must be based on plans developed for river basins as a whole rather than on a variety of plans by separate agencies for separate purposes. "The motto must be 'one river, one plan.' "[105] The Commission defined the river basin concept:

> It recognizes the interrelation of resources elements in a single basin, and it presumes that multiple-purpose measures can be undertaken in harmony with the unified development of the entire

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95. S. REP. No. 29, 87th Cong., 1st Sess. 45 (1961).

96. PRESIDENT'S WATER RESOURCES POLICY COMMISSION, WATER RESOURCES LAW (VOL. 3) 393 (1950), *quoting*, S. Doc. No. 325, 60th Cong., 1st Sess. iii (1908).

97. *Id.* at 400, *quoting*, S. Doc. No. 469, 62d Cong., 2d Sess. 52 (1912). *See also* L. TECLAFF, THE RIVER BASIN IN HISTORY AND LAW 120 (1967).

98. L. TECLAFF, *supra* note 97, at 121.

99. 16 U.S.C. §§ 831-831dd (1982). For a discussion of the history of the Tennessee River Valley Act *see* PRESIDENT'S WATER RESOURCES POLICY COMMISSION, *supra* note 96 at 481-86.

100. Wengert, *The River Basin Concept as Seen from a Management Perspective in U.S.A.*, in STRATEGIES FOR RIVER BASIN MANAGEMENT 301 (1985).

101. L. TECLAFF, *supra* note 97, at 132.

102. *Id.* at 122.

103. *See, e.g.*, PRESIDENT'S WATER RESOURCES POLICY COMMISSION, A WATER POLICY FOR THE AMERICAN PEOPLE (VOL. 1) 10-11 (1950).

104. PRESIDENT'S WATER RESOURCES POLICY COMMISSION, (VOLS. 1-3) (1950).

105. PRESIDENT'S WATER RESOURCES POLICY COMMISSION, *supra* note 103, at 9.

> basin. From forest and upland farm to downstream city, from headwaters to the sea, a river basin is seen as one dynamic and organic system. This view offers a new opportunity to coordinate the tools of science, technology, and finance in unified developments, and it extends the principle of ecological balance to the whole of the area and its occupants.[106]

In 1961, the Senate Select Committee on National Water Resources advocated a cooperative effort between the federal government and the states to prepare comprehensive water development and management plans for all major river basins in the country.[107] These various reports culminated in the enactment of the Water Resources Planning Act of 1965.[108] The Act enabled the President to establish river basin planning commissions that would serve to coordinate federal, state, local, and private plans for developing the water and related land resources. Since basin commissions had more attenuated powers than valley authorities, they represented less of a threat to state departments engaged in water resources development.[109] Under the Act, the federal government provides financial assistance to the states.

Planning under the 1965 Act had very limited success and the river basin commissions have been largely disbanded. Several reasons have been suggested for the failure of the Act to provide for comprehensive resource planning.[110] First, there was a lack of knowledge about ecological processes in the watershed. Second, there were technological impediments to implementing management measures. Third, funding was insufficient to support a comprehensive planning effort. Fourth, the Act ran head-on into the obstacles created by the classic doctrine. Water management is an area traditionally left to the states and the states were suspicious of federally controlled programs. Since river basin boundaries seldom correspond

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106. *Id.* at 271-72.

107. S. REP. No. 29, 87th Cong., 1st Sess. 17 (1961).

108. 42 U.S.C. §§ 1962-1962d-18 (1982). Even earlier, in 1955, Oregon adopted a detailed statutory planning system in which the state was divided into 13 (now 18) basins; after study, each stream segment in each basin was zoned for specified future water uses. *See* OR. REV. STAT. §§ 536.007 to 536.730 (1987) (emphasis on §§ 536.220 and 536.300). Just as a city block will be zoned residential, light industrial, or whatever, Oregon streams were designated for agriculture, 2-acre family gardens, municipal use, instream flows, and other purposes. The Oregon planning system and its implementation have been stalled by a lack of funding. In addition, the vested interests insisted that the basin plans would be prospective only, so that no existing uses under the classic doctrine were affected. OR. REV. STAT. §§ 536.580 to 536.590 (1987). Nevertheless, the Oregon statutory framework holds great promise for other jurisdictions.

109. L. TECLAFF, *supra* note 97, at 143.

110. Conversation with Gilbert F. White (Oct. 27, 1988). *See also* Getches, *Water Planning: Untapped Opportunity for the Western States*, 9 J. ENERGY L. & POL'Y 25-26 (1988). At the time of the National Water Commission's Report to the President in 1973, many of these deficiencies were already apparent. The Commission pointed out that the federal government was not using the river basin commissions as a sole coordinating body for watershed planning. Rather, other federal programs permitted water resource use decisions to be made outside of the commissions. Additionally, Congress did not provide the states with full funding of the Act. Finally, the Commission found that the basin commissions had failed to consider the views of local governments and private entities. NATIONAL WATER COMMISSION, *supra* note 60, at 371-72.

with state boundaries, there were problems with interstate integration. And, of course, there was dogged resistance from private rights holders to any governmental intrusions on their water rights. By the 1970's comprehensive river basin approaches to resource planning began to disintegrate and in 1981 six of the river basin commissions were terminated.[111]

The movements for integrated resource planning during the early 1900's, the 1930's, the 1950's, and the 1960's provide useful templates for comprehensive planning in the late 20th century. They also prove that fundamental reform of western water policy probably will have to be initiated by the states, with the likely federal role being mainly reactive and limited primarily to such areas as coordination, research, and perhaps funding. A number of disparate movements, discussed below, suggest that there is an unprecedented ferment at the state level and that the climate may be ripe for a serious reexamination and modernization of water policy in the western states.

Comprehensive water resource management, as I envisage it, would not usurp state primacy but would include extensive consultation, cooperation, and, most preferably, binding coordinated planning with other governmental units. In western states, the watershed is usually the logical planning unit.[112] The optimal watershed size will, of course, vary from state to state.[113] Several states have already defined appropriate watershed

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111. Wengert, *supra* note 100, at 302; Exec. Order No. 12,319, 46 Fed. Reg. 45,591 (1981).

112. *See* President's Water Resources Policy Commission, *supra* note 103, at 3. An integrated approach to water management must be based upon a defined ecological unit within which the interactive effects of a given management decision can be discerned. In defining such a unit, one must find a balance by including the entire area that may be affected by a given management decision while limiting the size of the area to that upon which a management strategy can be practically based and implemented. The river basin or watershed represents an optimal compromise. *See* J. Dixon & K. Easter, *Integrated Watershed Management: An Approach to Resource Management*, in WATERSHED RESOURCES MANAGEMENT: AN INTEGRATED FRAMEWORK WITH STUDIES FROM ASIA AND THE PACIFIC 3 (1986) (stating that management at the watershed level allows for extensive internalization of externalities resulting from a given management decision because of the biophysical linkages within the watershed).

113. For discussions on the economic implications of integrated river basin planning versus planning at the level of individual watersheds, see Brinser, *Meshing Watershed Development with River Basin Development*, in ECONOMICS OF WATERSHED PLANNING 70 (1961); Riggs, *The Watershed as an Entity for Planning*, in ECONOMICS OF WATERSHED PLANNING 59 (1961). In an extensive river basin planning report, the President's Water Resources Policy Commission stated that the optimal size for a watershed as a management unit is dependent upon local community conceptions:

> A watershed so large that its inhabitants cannot see their relation to it, or feel responsible for it, is too large to serve as a conservation unit. On the other hand, one so small that even major improvements would benefit only a small group could not command the active support and participation of the surrounding community.
>
> The practical-sized watershed is one on which the residents are willing to spend time, money, and energy because they regard it as their own. It is an area with which they associate their pasts, and particularly their personal futures. It provides a wide range of improvement opportunities, with a correspondingly wide range of potential benefits, both public and private. It has sufficient population, with a diversity of interests, to assure effective support for the full range of improvement work.

PRESIDENT'S WATER RESOURCES POLICY COMMISSION, *supra* note 103, at 125.

units for specific purposes, usually much narrower than comprehensive planning. Colorado, for example, has seven water divisions.[114] Oregon has eighteen[115] and Wyoming and Montana have divided their states into watersheds for various purposes.[116]

To take the Bighorn Basin as an example, the state of Wyoming might have the most extensive staff and might in fact exert the greatest authority, but the state would cooperate with management regimes established by the Forest Service, the BLM, the Wind River Tribes, and perhaps counties and cities. Ideally, the cooperative effort would be implemented through a joint water planning board on which all of the governments would sit, with the decisions of the joint board being either advisory or binding, depending upon the agreement among the various governments and agencies.[117] Further, since the Bighorn is an interstate river, one would hope that there would be a cooperative arrangement with a similar board in Montana, comprised of state, federal, and tribal entities.

Good scientific planning and management are based upon good data.[118] A joint board such as I suggest would be a substantial enough body to develop, and keep current, an inventory of physical, biological, and human

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114. COLO. REV. STAT. § 37-92-201 (1973) (creates seven water divisions based on drainage basins).

115. OR. REV. STAT. § 536.700 (1987).

116. *See, e.g.*, WYO. STAT. § 41-3-501 (1977), which divides the state of Wyoming into four water divisions based upon major river basins within the state. Likewise, the state of Montana has been divided into four water divisions based upon major drainages within the state. MONT. CODE ANN. § 3-7-102 (1987). MONT. CODE ANN. § 85-2-301 (1987) specifies six river basins where appropriation by individuals for transport outside of the basin is prohibited. On December 8, 1950, Montana, Wyoming and North Dakota entered into the Yellowstone River Compact to apportion the waters of the Yellowstone River and its tributaries. The compact defines the Yellowstone River basin as "areas in Wyoming, Montana, and North Dakota drained by the Yellowstone River and its tributaries, and includes the area in Montana known as Lake Basin, but excludes those lands lying within Yellowstone national park." WYO. STAT. § 41-12-601 (1977) (Article II(c) of the Yellowstone River Compact).

117. The Northwest Power Planning Council represents an example of a multi-state water planning entity. Created by the Pacific Northwest Electric Power Planning and Conservation Act in 1980, the Council provides coordinated management of the water, energy, and fish and wildlife resources of the Columbia River and its tributaries. The Council consists of two members from each of the Columbia Basin states (Idaho, Montana, Oregon and Washington) who are appointed by the governors of each state. Plans established by the Council are then implemented through federal agencies and are financed by hydropower revenues. Volkman & Lee, *Within the Hundredth Meridian: Western States and Their River Basins in a Time of Transition*, 59 U. COLO. L. REV. 551, 562 (1988).

> Although federal agencies are cast in the role of implementors of regional policies, the Council also carries out federal policies. National policies and interests such as energy conservation, fish and wildlife conservation, the legal rights of Indian tribes, environmental quality, and public utility preference, have special emphasis under the Act and in the Council's planning. Rather than being a reaction against federal interests, then, the Act created a way for the region to weave federal interests into the region's plans. (footnotes omitted).

Id. at 565.

118. Planning is "the process that converts data and information into a decision." O. HELWEG, WATER RESOURCES: PLANNING AND MANAGEMENT 35 (1985). Planning is a procedure aimed at choosing the best alternative to achieve a certain objective. L. CUHNA, V. FIGUEIREDO, M. CORREIA, & A. GONCLAVES, MANAGEMENT AND LAW FOR WATER RESOURCES 58 (1977). Thus, two critical factors in successful planning are: (1) clearly defined objectives; and (2) a sufficient data base upon which alternative plans can be based. An adequate data

resources within the watershed. Since different kinds of planning and management activities would inevitably be carried out by various governmental authorities within the basin, all participants would benefit from such an inventory. An inventory, which can be very expensive to develop, need not always be exhaustive. To take one example, the quality of the fishery resource is often a reliable indicator of environmental quality; optimization of the fishery resource generally promotes the well-being of all wildlife as well as recreational and aesthetic values.[119] Thus, a complete inventory of the quality of the fishery resource (or even one species), rather than of all the myriad environmentally-related indicators, may provide the basis for the protection of several different kinds of values in a particular watershed.

Another method for dealing with incomplete data when implementing a resource management plan has been adopted by the Northwest Power Planning Council. Termed "adaptive management," this policy entails treating the initial management plan as a series of experiments designed to test and extend the scientific basis of the plan.[120] The key is to advance the knowledge base and adjust the management plan accordingly by learning from the implementation of the plan. Thus, a full data base, while desirable, is not an indispensable prerequisite to implementation of a comprehensive watershed resources plan.

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base is necessary for evaluating the interactive effects of a given management action. Based upon an evaluation of these effects, in light of defined management objectives, an appropriate management plan may be developed.

The data base must initially include an inventory of physical, biological, and human resources. *See* O. HELWEG, *supra* at 36; D. SATTERLUND, *supra* note 71, at 340-43 (for a listing of elements to be included in a watershed management data base). An inventory is the first step in developing a watershed management plan. At the same time, data provides only a neutral information base and should not be confused with substantive policy objectives:

> Technically trained watershed managers have developed a finely tuned awareness of water resources and a special competence to deal with water yield problems. They have a strong tendency to look first at the land to determine the inventory information that is needed to provide the basis for a management plan that will result in the best possible water yields, for they tend to take for granted that the "best possible water yields" should be the objective of management.
>
> This is their most common mistake . . . . Watershed resources are for people. Water values have meaning only in terms of the people involved: those who are affected by water yields, within or beyond the watershed boundaries, and those who own or use the watershed for any of the numerous goods and services it produces. They determine the position of water values on the scale of possible alternatives on the basis of their needs and problems, desires, or rights.

D. SATTERLUND, *supra* note 71, at 334.

119. D. ALLARDICE, *supra* note 69, at 111.

120. Lee & Lawrence, *Adaptive Management: Learning from the Columbia River Basin Fish and Wildlife Program*, 16 ENVTL. L. 431 (1986). The Northwest Power Planning Council has a legislative mandate to protect and enhance the fish and wildlife populations in the Columbia River Basin. A major focus of the Council's efforts is the restoration of salmon and steelhead runs in the Basin. The Northwest Power Act emphasizes action based on the "best available scientific knowledge." *Id.* at 441-42. Given the Act's emphasis on action rather than research and the incomplete biological data on fisheries, the Northwest Power Planning Council has relied on adaptive management as a means for further developing the data base while beginning to take action toward meeting its legislative goals. *Id.* at 431.

It may not be economically or politically practical to implement comprehensive management techniques immediately. Comprehensive management strategies can be developed in phases. Riparian control measures have been suggested as an effective starting point in developing a watershed management strategy.[121] Activities in riparian zones have extensive effects on water quality and quantity, wildlife and fisheries populations, and erosion. Thus, setting rehabilitation and preservation of riparian habitat as an initial focus of a comprehensive management scheme can move a management program in its infancy a long way toward reaching its ultimate goals.

I well understand that cooperation and planning of the kind I suggest may now be anathema in most western states, given the entrenched laissez faire attitudes of powerful water development interests and the warring relationships among many of the entities I have described. But basinwide management and planning are the right way to go about it and my own guess is that states will steadily move in that direction, as the stresses on western water winch up day by day by day.

B. Substantive Policy Objectives

Thus planning and management by watershed are, in my view, the foundation for achieving a balanced, comprehensive water policy — for thinking perpendicular to the prior appropriation doctrine. But there also need to be specific substantive policy objectives. Broadly speaking, these objectives should include the following:

1. *The maximization of the societal benefits derived from resource use.* This should be considered the ultimate objective of any watershed planning scheme. Achievement of this objective requires an allocation of resources to the "highest and best" uses as well as efficient utilization of the resources. Thus, watershed planning would make explicit social, cultural, and economic choices, just as does land planning. The allocation process must include consideration of economic development, the cultural characteristics of the people inhabiting the watershed, the aesthetic qualities of the watershed, and the watershed ecosystem, including the wildlife inhabiting the watershed. This process requires the integration of land-use and water planning.

With respect to the water resource, this would entail the provision of water for future development of traditional beneficial uses. Such uses — municipal, heavy industry, light industry, agriculture, ranching, etc. — would be identified and priorities would be set, even if in rough terms. Allocations would be made for Indian reserved rights and other federal reserved rights. Additionally, provision would be made for the maintenance of instream flows for wildlife, recreation, and aesthetic purposes. This requires concurrent consideration of water quantity and water quality issues as well as concurrent management of groundwater and surface water.

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121. Petersen, *supra* note 69, at 167.

2. *The maintenance of a sustainable resource base.* Too often, resources are consumed for short-term economic gain, while long-term sustainability is ignored.[122] In Aldo Leopold's terms, a sustainable society requires the preservation of "land health." "Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity."[123] "The most important characteristic of an organism [including the land organism] is that capacity for internal self-renewal known as health."[124]

There are two broad elements in achieving a sustainable society. First, there must be conservation of resources, so that resources will be used as efficiently as practicable. Efforts to conserve the water resource should include regulation to reduce consumption and diversion of water by all users so that there will be a reduced reliance on structural alternatives such as dams and interbasin transfers in the future. Over time, the current high level of waste can be significantly reduced through installing reasonably available technology that would permit more efficient use of the water resource. Further, the conservation efforts should include the pricing of water. Governments ought to receive revenues when water is developed, just as they routinely do when other public resources are used for extractive purposes; a charge for the use of public water will also provide an incentive to save water. The charge, which should be levied on every water developer for every acre-foot diverted, ought to be nominal at first but should gradually be increased. All elements of a conservation policy must be acutely sensitive to the needs of individual water users, especially struggling farm and ranch communities, by allowing a substantial phase-in period and by including provisions for such things as low-interest loans, tax write-offs, and other financial incentives for conservation improvements.[125]

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122. Kai Lee, *An Uncommon Future: Rebuilding the Salmon Runs of the Columbia River, U.S.A.*, 5 (June 14, 1988). (Unpublished document on file with the LAND & WATER L. REV.).

123. A. LEOPOLD, *supra* note 82, at 258.

124. *Id.* at 272.

125. A watershed approach to managing water resources looks at the river basin as a whole, but should take account of individual differences. Where the implementation of a management decision provides benefits to the watershed inhabitants as a whole, yet creates a negative economic effect on certain individuals, "implementation tools such as subsidies become necessary." Dixon & Easter, *Economic Analysis at the Watershed Level*, in WATER RESOURCES MANAGEMENT 53, 55-58 (K. Easter, J. Dixon, & M. Hufschmidt, ed. 1986). Leopold's land ethic ("A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." LEOPOLD, *supra* note 82, at 239) has been interpreted similarly to provide for a consideration of individual interests. *See* Hefferman, *The Land Ethic: A Critical Appraisal*, 4 ENV. ETHICS 235 (1982); Moline, *Aldo Leopold and the Moral Community*, 8 ENV. ETHICS 99 (1986). Leopold's maxim, if read literally and in isolation, might suggest that there is no place for individual human rights. But, as both Hefferman and Moline have explained, Leopold envisaged no such thing. Leopold's land ethic is best understood as requiring a balancing test when making resource management decisions: Where human survival interests are at stake, they outweigh the interests of the biotic community; however, where the nonsurvival interests of humans are at stake, the interests of the biotic community prevail. Hefferman, *supra*, at 246. Under this analysis, Leopold's land ethic would allow a phase-in period or subsidies to implement more efficient irrigation practices where individual farmers would be unable to continue their farming operations if immediate improvements were required.

Second, no proposed new uses should be allowed, even if efficient, unless the use can be accommodated within the context of a sustainable resource base. Resource planners must consider the capacity of the resource base to support any new use, even if the new use is internally efficient and provides immediate short-term economic benefits. Thus, for example, states should not only prohibit the mining of rechargeable groundwater aquifers, but also should refuse to permit extractions of surface water when soil conservation goals cannot be sustained, when water quality levels cannot be maintained, or when wildlife populations cannot be sustained at acceptable levels. Further, the watershed concept suggests that development normally should be based upon water supplies from within the basin. Such an approach, premised on what I call an ethic of place, forces a focus upon conservation and discourages raids upon the natural resources of other communities.[126] Thus, major interbasin transfers should be allowed only when there are compelling circumstances; when the importing basin has an effective conservation program; and when the basin of export has been fully compensated in the best fashion available.[127] In developing programs to guarantee a sustainable resource base, states should be guided by the rapidly maturing body of writing and practice on the policy of sustainable development.[128]

3. *The maintenance of a reasonable degree of stability for private water rights.* This is a central objective of a sound water policy, although it is currently overemphasized and wrongly made nearly absolute by the classic doctrine.

States ought to consider, when new water uses are approved, granting rights that are reasonably secure — but not permanent and absolute, as is the case with rights obtained under the classic doctrine. One possible approach would be to provide for fixed term leasing of water, a concept widely used in eastern states and in foreign countries.[129] Among western states, Montana has adopted such a leasing program on a limited basis. In Montana, a person may not appropriate water if it would be transported out of several specified river basins or if a proposed consumptive use is in excess of 4,000 acre-feet a year.[130] In these circumstances, water users must instead lease the water from the State Department of Natural

126. *See* Wilkinson, *Law and the American West: The Search for an Ethic of Place,* 59 U. COLO. L. REV. 401 (1988).

127. *See generally* MacDonnell & Howe, *Area-of-Origin Protection in Transbasin Water Diversions: An Evaluation of Alternative Approaches,* 57 U. COLO. L. REV. 527 (1986).

128. *See generally* W. CLARK & R. MUNN, SUSTAINABLE DEVELOPMENT OF THE BIOSPHERE (1986); EXPERTS GROUP ON ENVIRONMENTAL LAW OF THE WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT: LEGAL PRINCIPLES AND RECOMMENDATIONS (1987).

129. Several of the eastern riparian states grant water rights under fixed term permits ranging in duration from 10 to 50 years. Davis, *Eastern Water Diversion Permit Statutes: Precedents for Missouri?,* 47 MO. L. REV., 429, 456-57 (1982). For a discussion of several countries' approaches to granting permits of limited duration, see U.N. DEP'T OF ECONOMIC AND SOCIAL AFFAIRS, ABSTRACTION AND USE OF WATER: A COMPARISON OF LEGAL REGIMES. 187-190, U.N. Doc. ST/ECA/154 (1972).

130. MONT. CODE ANN. § 85-2-301 (1987).

Resources and Conservation.[131] Such leases may be for a period of up to fifty years with the possibility of an extension for another fifty years after a redetermination of the desirability of the lease. Such a leasing program provides stable water rights upon which development expectations may be based, while allowing some flexibility to account for future changes in the socio-economic and ecological circumstances of a region.

4. *The maintenance of water quality, including control of both point and non-point source pollution from all lands within a watershed.*

5. *The prevention of soil loss resulting from unwise land-use such as overgrazing, improperly located roads, and poor timber and agricultural practices.*[132]

6. *Economic efficiency in regard to transfers of water.* The promotion of efficient transfers, so that old uses can smoothly move to new ones, was emphasized in the recent Western Governors Association Report, *Western Water: Tuning the System.*[133] Present inefficiencies exist due to uncertainty in the marketability of water rights and the nonrepresentation of public interests in water markets.[134] By concisely defining transferable rights after consideration of public interest values, planning can promote more efficient water marketability.

One concept that undergirds much of the above analysis is the idea that, over time, current water uses established under the classic doctrine ought to be reduced to true beneficial use, that is, efficient use without unreasonable waste. This means squeezing the system to reduce current inefficient diversions. There is no longer any doubt that such a process does not amount to a taking of vested property rights. This is made clear by the cases allowing states to move from hybrid systems to pure prior appropriation by eliminating riparian rights;[135] the decisions permitting states to repeal the absolute ownership rule for groundwater and adopt regulatory systems for groundwater;[136] the *Town of Chino Valley* case that upheld Arizona's rigorous 1980 groundwater law;[137] the 1986 Sacramento Bay Delta decision that affirmed state administrative power to require existing diversions to be reduced in order to combat salt water incursion

131. MONT. CODE ANN. § 85-2-301(b) (1987).

132. In 1922, Aldo Leopold clearly recognized the multiple adverse effects of soil erosion and predicted that "[t]he prevention of further erosion is an obligation which will someday attach to the ownership of all land." Leopold, *supra* note 75, at 633.

133. *See generally* WATER EFFICIENCY TASK FORCE, REPORT TO THE WESTERN GOVERNORS' ASS'N, WESTERN WATER: TUNING THE SYSTEM (B. Driver ed. 1986).

134. *See* Getches, *Water Planning: Untapped Opportunity for the Western States*, 9 J. ENERGY L. & POL'Y 1, 4-8 (1988).

135. *See, e.g.*, In re Waters of Long Valley Creek Stream System, 25 Cal. 3d 339, 599 P.2d 656, 158 Cal. Rptr. 350 (1979). *See generally* Trelease, *Coordination of Riparian and Appropriative Rights to the Use of Water*, 33 TEX. L. REV. 24 (1954).

136. *See, e.g.*, State v. Dority, 55 N.M. 12, 255 P.2d 1007 (1950); Knight v. Grimes, 80 S.D. 517, 127 N.W.2d 708 (1964).

137. Town of Chino Valley v. City of Prescott, 131 Ariz. 78, 638 P.2d 1324, 1330 (1981) *appeal dismissed*, 457 U.S. 1101 (1982). *See also* Cherry v. Steiner, 543 F. Supp. 1270 (D. Ariz. 1982), *aff'd* 716 F.2d 687 (9th Cir. 1983).

into the Delta;[138] and many others.[139] The Ninth Circuit Court of Appeals has summarized the rule neatly by observing that "beneficial use expresses a dynamic concept, which is a 'variable according to conditions,' and therefore [is a variable] over time."[140] Professor Freyfogle has made exactly the proper comparison of regulation of water to regulation of land:

> Takings jurisprudence now clearly supports a government's power to limit the bundle of rights that a property owner possesses. Water should be no more sacred than land. Courts should require a water owner, like a landowner, to comply with property use restraints so long as the restraints permit some reasonable property uses and amortize nonconforming uses fairly.[141]

Ultimately, Leopold's land ethic should serve as an underlying substantive guideline for all decisionmaking in water policy.[142] Thus, the local human community should be viewed as an integral part of the ecological watershed community. All resource use decisions should be made with an eye toward preserving "the integrity, stability, and beauty" of the watershed community.

VI. RECENT DIRECTIONS IN WATER REFORM

Reform of western water law has begun to take shape. The impetus for change has come from three main sources: state legislatures, the courts, and grass-roots activism. While these reforms are a long way from a comprehensive plan of watershed resource management, they illustrate initial efforts to think perpendicular to the classic doctrine.[143]

A. Legislative Action

The year 1987 was of great significance for water issues in the Oregon Legislature. Among other things, Oregon revamped its instream flow laws.[144] In the past, instream flows had been planning directives administered by the Department of Water Resources, while under the new law the instream flow is a hard water right held by the state.

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138. United States v. State Water Resources Control Bd., 182 Cal. App. 3d 82, 227 Cal. Rptr. 161, 185-87 (1986).

139. *See generally* Wilkinson, *supra* note 10, at 332-33.

140. United States v. Alpine Land and Reservoir Co., 697 F.2d 851, 855 (9th Cir. 1983) (quoting *Farmers Highline Canal & Reservoir* 129 Colo. at 585, 272 P.2d at 634).

141. Freyfogle, *Water Justice,* 1986 U. ILL. L. REV., 481, 518 (footnote omitted).

142. *See supra* notes 82-89 and accompanying text.

143. For a discussion of other state efforts toward water planning, see Getches, *supra* note 110, at 28-32.

144. S.B. 140, 64th Leg., Regular Sess., 1987 Oregon (gives instream water rights the same status as other rights except that future municipal purposes shall have precedence over these rights). Other examples of water related provisions enacted by the 1987 Oregon Legislature are S.B. 23 (creates a Watershed Enhancement Board composed of chairpersons or designees of the Environmental Quality Commission, Fish and Wildlife Commission, Board of Forestry, Soil and Conservation Commission and the Water Resources Commission to coordinate watershed enhancement projects); S.B. 135 (provides for coordinated management of surface and groundwater by allowing the Water Resources Commission to regulate wells that interfere with senior surface water rights); and H.B. 2974 (requires screening on all diversion structures where the Department of Fish and Wildlife determines this to be necessary to protect fish).

The Oregon Legislature also passed legislation to give water users an incentive to conserve water. One element is much like that adopted in California.[145] Under the new Oregon provision set out in Senate Bill 24,[146] a water user is entitled to use or sell conserved water so long as there is no injury to existing water rights (basically, this means that the conserved water in question can include only water that would be lost to the system, not return flows, since other users usually rely on return flows).

But in Senate Bill 24 Oregon added some concepts that are wholly unprecedented in the law of any state. After calculating the amount of allowable conserved water, the Water Resources Commission then allocates a benchmark amount of twenty-five percent to the state. In most cases, this twenty-five percent share of the conserved water will be managed as an instream flow with the same priority date as the original appropriation. Thus, if an appropriator with an 1880 priority date conserves twenty cubic feet per second (cfs) of water, five cfs normally will be held by the state as an instream water right with an 1880 priority date. I have no doubt that the provision is constitutional: all other junior and senior water users will be in exactly the same position after this process as they were before the dedication of conserved water to the state for instream flow purposes.

The new Oregon statute goes further. The water user conserving the water is not only entitled to sell the remaining portion of allowable conserved water (i.e., seventy-five percent of the conserved water that will not adversely affect other users), but also can "reserve the water instream for future out of stream use."[147] In other words, so long as the person conserving the water leaves the water in the stream, there is no abandonment or forfeiture and other water users cannot use the conserved instream water. Thus, the conserved water is effectively an instream right during the time that the party is contemplating a sale which, of course, can be made to the state for the purposes of maintaining instream flows. Again, this procedure will not violate any constitutional provisions because the status quo is maintained as to all other water users.

The extraordinarily creative ideas embedded in Senate Bill 24 could be applied in other situations. A state could, for example, provide that an abandoned water right would revert to the state and could not be used by junior water users. The state could then apply the abandoned water right to an instream flow, or some other use, with the priority date of the former user. Similarly, the rationale behind Senate Bill 24 could be applied to water that is saved through mandatory conservation measures say, for example, by a reduction of the allowable duty of water in a particular watershed from three acre-feet to two-and-a-half or two acre-feet over a period of ten years. Part or all of the saved water could, by statute, revert to the state, which could allocate the water to an instream flow or some other use, again with an early priority date.

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145. *See, e.g.*, California Water Code §§ 1010-1011 (West Supp. 1988).
146. S.B. 24, 64th Leg., Regular Sess., 1987 Oregon.
147. *Id.* § 8.

Senate Bill 24 strikes me as containing one of the most important ideas adopted in all of water law. It holds out a constitutional method of establishing senior instream water rights without injuring any senior or junior water users.

Legislative reform came in a different fashion to create the historic Arizona Groundwater Act of 1980.[148] The Act arose out of the ferment created by a well-substantiated water crisis in Arizona, the desire to obtain the much-anticipated Central Arizona Project, and the courageous and farsighted actions of Governor Bruce Babbitt. Ultimately, Babbitt sequestered a blue ribbon citizens group, directed them to come up with groundwater reform, and they did.

Still another set of political circumstances led to the comprehensive water reform conducted by the Montana Legislature in 1985.[149] Among other things, the legislature adopted sweeping stream access provisions;[150] a program to meld water pollution considerations and the granting of new permits;[151] a restriction on large transfers of water out of specified basins;[152] and a water leasing program that, when applicable, will allow only leasehold rights, not permanent vested rights, to developers of certain large projects.[153] The Montana legislation, unlike Arizona's, was not created by crisis as much as it was by the progressive coalition of ranchers and environmentalists that is the hallmark of the many advances that, taken together, have made Montana perhaps the leading conservation state in the West during recent years. Together, the ranchers and environmentalists were able to think perpendicular to the prior appropriation doctrine.

B. The Courts

Judges have used increasingly strong language to decry waste and encourage conservation, although that language is often in dictum rather than holdings.[154] But waste has always been prohibited in western water law, and those judges, while extending the reach of doctrine, were working from reasonably explicit statutes and earlier court decisions. Other judges have gone further and, however much they might have struggled

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148. ARIZ. REV. STAT. ANN. § 45-401 to -637 (1987). *See* Connall, *A History of the Arizona Groundwater Management Act*, 1982 ARIZ. ST. L.J. 313.

149. *See generally* Thorson, Brown & Desmond, *Forging Public Rights in Montana's Waters*, 6 PUB. LAND L. REV. 1 (1985).

150. MONT. CODE ANN. §§ 23-2-301 to 23-2-322 (1987). Some provisions were struck down in Galt v. Montana, 731 P.2d 912 (Mont. 1987).

151. *See* MONT. CODE ANN. § 85-2-311 (1987). In deciding upon applications for permits to divert more than 4,000 acre-feet or more a year and 5.5 or more cubic feet per second, the Department of Natural Resources and Conservation must consider the effect of the diversion on water quality and the probable adverse environmental impacts. *Id.* at § 85-2-311(2).

152. MONT. CODE ANN. § 85-2-301(2)(a)(i) (1987) (allows only the Department of Natural Resources and Conservation to appropriate water outside of specified basins — this can be leased from the Department).

153. MONT CODE ANN. § 85-2-301(2)(a)(ii) (1987).

154. *See generally* Pring & Tomb, *License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West*, 25 ROCKY MTN. L. INST. 1 (1979).

to base their decisions on existing law, they were acting in large part as a matter of conscience, as common law courts traditionally have done in situations of great stress.

One leading example is a recent trial court ruling by District Judge Art Encinias, sitting in Rio Arriba County in northern New Mexico.[155] The State Engineer had granted an application to change the diversion point, and the purpose and place of use, of surface rights. The existing use was for irrigation and the purpose of the proposed change was to provide water for a ski resort and guest ranch. Since there was no transfer out of the basin, the area of origin statutes were not implicated. While the New Mexico public interest statute provided that appropriations may be disapproved by the State Engineer if "approval thereof would be contrary to the public interest,"[156] the statutes relating to changes of existing appropriations contained no such language. Nevertheless, the trial judge set aside the administrative action because it was contrary to the local public interest:

> Northern New Mexicans possess a fierce pride over their history, traditions and culture. This region of northern New Mexico and its living culture are recognized at the state and federal levels as possessing significant cultural value, not measurable in dollars and cents. The deep-felt and tradition-bound ties of northern New Mexico families to the land and water are central to the maintenance of that culture.
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> . . . .
>
> I am persuaded that to transfer water rights, devoted for more than a century to agricultural purposes, in order to construct a playground for those who can pay is a poor trade, indeed. I find that the proposed transfer of water rights is clearly contrary to the public interest and, on that separate basis, the Application should be denied.[157]

The cases employing the public trust doctrine are another example of how the courts have come to terms with the inherent inadequacies of the classic doctrine.[158] Of course, the leading case in this area is the Mono Lake case handed down by the California Supreme Court in 1983.[159] In 1940, the City of Los Angeles had obtained a permit to appropriate water from four main tributaries feeding into Mono Lake. By 1970, Los Angeles was diverting nearly the entire flow of these tributaries. By 1979, the level of Mono Lake had dropped significantly. In holding that Los Angeles's

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155. In re Sleeper, No. RA 84-53, slip op. at 6-7 (Rio Arriba County Dist. Ct. N.M. April 16, 1985), *rev'd on other grounds*, No. 8720-8830 (N.M. Ct. App. Mar. 22, 1988), *cert. granted*, No. 17661 (N.M. May 11, 1988), *writ quashed*, 759 P.2d 200 (Aug. 2, 1988).

156. N.M. STAT. ANN. § 72-5-7 (1978, Repl. 1985). A 1985 amendment to this provision substituted "approval would be contrary to the conservation of water within the state or detrimental to the public welfare of the state," 1985 N.M. Laws ch. 201 § 4, for "approval thereof would be contrary to the public interest." N.M. STAT. ANN. § 72-5-7 (1978).

157. *In re Sleeper*, No. RA 84-53, slip op. at 6-7.

158. *See supra* note 16.

159. *National Audubon Soc'y v. Superior Court of Alpine County*, 658 P.2d 709.

permits were subject to the constraints of the public trust, the court provided a general mandate: "The state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible."[160] Not only did the court require that public values be considered during initial trust allocation decisions affecting navigable waters, but, in addition, the state has a duty continuously to insure that public trust values are served by past allocation decisions: The public trust "is an affirmative duty of the state to protect the people's common heritage of streams, lakes, marshlands and tidelands. . . ."[161]

Like Judge Encinias in New Mexico, the California Supreme Court was thinking perpendicular to the prior appropriation doctrine by looking at water as one vital element in the ecological and socio-economic communities of which we are a part. My strong sense is that this trend will continue: The beneficiaries of the classic doctrine have succeeded in making prior appropriation into statutory law, but western water law arose as common law, and there is still room for common-law judging on important issues. Frustrated, commonsense judges will continue to want to think perpendicular to prior appropriation.

C. Grass-roots Activity

A final model is found in Oregon and, in a sense, it is the most remarkable of all. Its success lies in grass-roots participation by energetic individuals working and living in the regions directly impacted by resource use decisions. For years, Tom and Audrey Simmons have acted as gadflies on water policy in Oregon. Audrey and Tom, both retired, are in their late sixties and became active several years ago simply because they were appalled by the narrowness of the Oregon water system. They formed a nonprofit organization called Water Watch. For years, Water Watch was not merely nonprofit — it had almost no funds at all. But Tom and Audrey talked around, read a great deal, lobbied as best they could, enlisted others, and proposed a wholly new set of ideas simply because they made sense. Finally, largely because their ideas also made sense to progressive Republicans and Democrats alike, the Oregon legislature put their ideas into law in the shape of Senate Bill 24 and other measures.[162] Audrey and Tom stand for grass-roots, participatory, creative democracy at its best.

There are other ways in which citizens can help instill a land ethic in the West. Aldo Leopold recognized the effectiveness of grass-roots efforts to reform unwise natural resource management policies, and he held a healthy mistrust for solutions to poor management practices that relied solely on "bigger and better" bureaucracies.[163] Although Leopold realized that government does have a role in natural resource management planning, he pointed out that "government, no matter how good,

160. *Id.* at 727 (footnote omitted).
161. *Id.* at 724.
162. *See supra* notes 144 and 146.
163. *See* Leopold, *Land-Use and Democracy*, 44 AUDUBON MAGAZINE 259 (1942).

can only do certain things."[164] Writing during the Second World War, Leopold felt it was time for America to "prove that democracy can use its land decently."[165] He proposed a strategy for individual citizen action to supplement public policy in the form of public land ownership and governmental regulation: "The formula is: learn how to tell good land-use from bad. Use your own land accordingly, and refuse aid and comfort to those who do not."[166]

Some of the answers for the future will come from water professionals, but, although we need their expertise and their help, many are so steeped in the classic doctrine that they will choose not to participate in the accelerating reform movement. My guess is that the best ideas will come up from the ground, from good landowners, scientists, economists, elected officials, judges, lawyers, and citizens who have no formal background in water law and who come at the issues fresh. This applies whether it is Governor Babbitt's bipartisan "Rump Group" meeting for hundreds of hours to negotiate over Arizona groundwater at Castle Hot Springs and other locations; unnamed range specialists and soil scientists laboring in their offices and laboratories to find sensible ways to keep still more millions of tons of our precious soil from slipping away; Judge Encinias sitting in isolation struggling to put into words the things he knew about the old culture that still lives in the mountain-rimmed Rio Chama Valley; Tom and Audrey Simmons, working their way through seemingly countless meetings and hearings, asking questions, making sensible, innovative proposals; or individual farmers and ranchers lining their ditches and keeping their cows out of riparian zones during the summer because they know that such labor improves the health of the land and water both for them and their neighbors.

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164. *Id.* at 262. Leopold recognized that government serves certain indispensable functions in conservation. "Government is the tester of fact vs. fiction, the umpire of bogus vs. genuine, the sponsor of research, the guardian of technical standards, and, I hasten to add, the proper custodian of land which, for one reason or another, is not suited to private husbandry. These functions will become real and important as soon as conservation begins to grow from the bottom up, instead of from the top down, as is now the case." *Id.* at 265. *See also* PRESIDENT'S WATER RESOURCES POLICY COMMISSION:

> The Federal Government is clearly charged with responsibility for safeguarding and developing our resources, but it is only one of the agencies involved. Its specific role is one of leadership — the provision of relevant scientific and economic information and coordination, as well as a public investment function on behalf of the entire Nation. These functions aid and supplement, but can never supplant, the work of local individuals and groups directly concerned.

Supra note 103, at 8.

165. *Id.* at 259.

166. *Id.* at 260. Curt Meine has pointed out that this was a recurring theme in Leopold's writing and thinking. Leopold argued "for a more democratic approach to land management: let those who live on, work on, and know the land assume, to as great a degree as is feasible, the responsibilities and privileges for implementing policy. Only their best judgment and input could ensure success in a broad-scale conservation effort." C. MEINE, *supra* note 78, at 127. Modern resource philosophers such as Wendell Berry emphasize the same point. *See generally* W. BERRY, THE UNSETTLING OF AMERICA: CULTURE AND AGRICULTURE (1977); K. SALE, DWELLERS IN THE LAND: THE BIOREGIONAL VISION (1985).

All of us ought to listen hard to those many kinds of people. They think perpendicular to the prior appropriation doctrine. They are the contemporary carriers of Aldo Leopold's words.

VII. CONCLUSION

There have been efforts on several fronts to begin thinking and acting perpendicular to the prior appropriation doctrine. Nevertheless, comprehensive statutory reform remains necessary before such efforts can be fully successful. Natural resource use decisions should be made within the context of an integrated watershed plan that evaluates the economic, ecological, and cultural effects of such decisions. The scope of analysis under the classic prior appropriation doctrine ignores many of the multiple interactive impacts of a given allocation of water on the whole watershed community.

Such change will not come easily. Western water law is characterized by a ponderous inertia built up by the interests that benefit from the doctrine's narrow analysis. But the barriers to change are not insurmountable. Aldo Leopold placed great faith in the ability of human society to come to understand its place in the scheme of things and to act accordingly. "I simply affirm that a sufficiently enlightened society, by changing its wants and tolerances, can change the economic factors bearing on the land. It can be said of nations, as of individuals: 'as a man thinketh, so is he.' "[167]

167. Leopold, *The Conservation Ethic*, 31 J. FORESTRY, 634, 643 (1933).