INTRASTATE WATER TRANSFERS IN THE WEST:
APPROACHES, PROBLEMS AND RELATED ISSUES

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Discussion Paper

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I. INTRODUCTION

Water is a critical element for all forms of life on this planet. Western development went hand-in-hand with development of western water resources. With certain exceptions (e.g., Alaska), western waters are now almost fully appropriated. Moreover, construction of new storage facilities is a less viable means of making additional supplies available on a significant scale than was historically the case. About 80% of western water rights are held by agricultural users,[1] while the remainder goes to municipal and industrial (M&I) users in about equal shares.

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[1] About 90% of all water consumed, and thus unavailable for other uses, is consumed in agriculture. In six states studied (CA, AZ, CO, NM, UT, WY), agriculture dominated all other uses (including farms, forestry, fisheries and agricultural services). M. Squillace, *Water Marketing and the Law*, *in* Moving the West's Water to New Uses: Winners and Losers (University of Colorado Natural Resources Law Center, summer program proceedings 1990). However, the percentages are changing in certain states. For example, California now dedicates more water to environmental than agricultural purposes. *See* California Water Plan Update (1994). Proponents of rural-to-urban transfers argue that agriculture plays a relatively minor role in the economic picture: according to the Statistical Abstract of the United States, farms, forestry, fisheries and agriculture altogether contributed the following percentages to 1989 gross state products: Arizona, 2.1%; California, 2.2%; Colorado, 2.6%; New Mexico, 2.2%; Utah, 1.7%; Wyoming, 1.9%) (Table No. 698). Yet when agriculture-dependent industries (e.g., packaging, finance, construction and retail-related sectors) are included, the picture may be significantly different: for example, agriculture and related industries are second only to tourism in revenue generated in California, according to the testimony of Lawrence Turnquist, President of Westlands Water District, before the House Subcommittee on Environment & Natural Resources (July 7, 1993). Of course, the contributions of agriculture to state revenues (in dollar terms) do not fully reflect the importance of agriculture to society. The market for agricultural commodities is one in which producers have little control over price setting due to the relatively large quantities of essentially fungible agricultural products available in the marketplace; thus, supply and demand do not operate so as to place a value on agricultural goods which approximates their value. As with other significant values of water that are not fully represented in market transactions, attempts to assess relative values of water use in terms of dollars

Today, the western economy is shifting from its traditional agriculture and resource extraction base to a diversified mix involving new technologies and service-based industries, urbanization, recreation, and government support activities. As a result, western states are concerned about responding to changing demands and traditional uses, providing sufficient reserves for period of drought, and meeting instream and riparian environmental objectives that may conflict with the exercise of previously granted water rights.[2] These factors are spurring state interest in facilitating flexible and equitable transfers to meet changing water demands.

Water occupies a unique place in the law, simultaneously recognized as a natural resource the use of which is subject to private ownership and control under private property concepts, and as a community resource with public values.[3] This double aspect of waters' legal status help explain the multifaceted system for water transfers, defined in the broadest sense. Water can be reallocated by governmental action (e.g., condemnation, forfeiture, or public trust supervision), by voluntary action of the water right holder (e.g., sales, leases, exchanges, or abandonment), or by litigation (combining governmental determination of rights with private initiation of suit). Voluntary transfers initiated by rights holders are usually favored over involuntary, regulatory reallocations.[4] Nonetheless, governments exercise some form of oversight and control of the

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realized or spent must be approached with caution. *See generally* discussion of nonmarket valuation approaches *infra*, Section IV part D(ii), "Administration of Transfers Affecting Instream Flows."

[2] While western states have significantly strengthened protection for instream values over the past twenty years, this comes after much of the water in the West had already been appropriated for off-stream uses.

[3] *See* discussion under section II, Background, part A, "A Brief History of Transfers," briefly summarizing the development of these two aspects of water values in society. *See generally* J. Sax, *Understanding Transfers: Community Rights and the Privatization of Water*, *in* 1 West-Northwest J. of Envtl. Law, Policy, Thought 13 (1994).

[4] J. Harbison, *Waist Deep in the Big Muddy: Property Rights, Public Values, and Instream Waters*, 26 Land and Water L. Rev. 535, 538 (1991). The values of private property rights in water include: 1) complete specification of entitlements and restrictions in water rights; 2) exclusivity of rights, so that benefits and costs of exercising those rights accrue only to the owner; 3) enforceability of exclusivity of ownership. *Id.*, 552. These factors, which support the marketability of water rights, may be undermined by the prospect of regulatory transfers which threaten to jeopardize the permanence of distribution and potentially render all acquired rights fundamentally unstable: "Exercise of the public trust doctrine . . . is political allocation with a vengeance. Vigorous application of the public doctrine would suppress the operation of all water markets." *Id.* at 539. On the other side of this issue, Joseph Sax writes: "The central idea of the public trust is preventing the destabilizing disappointment of expectations held in common, but without formal recognition, such as title. The function of the public trust as a legal doctrine is to protect such public expectations against destabilizing changes just as we protect conventional private property from such changes.

transfers market.[5] This dual nature of the water transfers market is a consequence of the value of water in private use, and as a community resource.

Despite the fact that states are enabling various forms of transfers and sometimes even encouraging them, water rights holders are often understandably reluctant to volunteer their water rights for transfer. Their concerns range from fear of inadvertently losing or limiting their water rights under a temporary transfer arrangement to receiving inadequate compensation for a permanent transfer. Governments are also facing increased concerns about so-called "third party" effects of transfers, particularly where rural-to-urban or out-of-basin transfers, large or permanent transfers, or significant natural values are affected.

These difficulties make it essential that government retain its general role in overseeing the water transfers market and facilitating transfers between willing buyers and sellers. Government agencies and irrigation company officials, attorneys, appraisers, engineers and other water experts are available to help guide water right holders through the hoops of water transfers. Water administration agencies are recognizing the need to provide certainty as well as incentives for transfers, to define processes to protect the public interest in water, and to limit unwanted third-party and environmental effects. Faced with limited supplies and changing demand, water administrators are key participants "in the larger westwide context of the transition from the 'Reclamation Era' to the era of reallocation."[6] There is no easy answer to the difficult issue of weighing public interests and values and encouraging voluntary transfers to "higher valued" uses. State involvement and oversight of the transfers market is needed if voluntary transfers are to help western states meet new and changing water demands, while avoiding the undesirable impacts on third parties and environmental values which can attend certain kinds of transfers.

Sax, *Liberating the Public Trust Doctrine from Its Historical Shackles, 14 U.C. Davis L. Rev.* 185, 187 (1980).

[5]Voluntary transfers have been defined as "voluntary changes in the existing purpose and/or place of use of water under an established legal right or entitlement." True reallocation requires a change in existing use and/or place of use of water, rather than a mere transfer in ownership A "water market" can be defined as an "institutional setting within which the right to use water is bought, sold, rented, or traded among consenting parties." Colby, Saliba *et al.*, Water Marketing in the Southwest -- Can Market Prices Be Used to Evaluate Water Supply Augmentation Projects?, U.S. Dep't of Agriculture, Forest Service (1987) at 2.

[6] D. Tarlock, *From Natural Scarcity to Artificial Abundance: The Legacy of California Water Law and Politics*, 1 West-Northwest J. of Envtl. L, Policy, Thought 73 (1994).

II. BACKGROUND

A. A Brief History of Transfers

The history of water law has been characterized by change. The changing history of water law reflects the evolution of society's needs and preferences, in which water invariably plays an essential role.[7]

Before the prior appropriation doctrine emerged in the West, "decisions about water were commonly based on the community or public interest rather than individual interest."[8] In studying six irrigation communities in the West, historians have found that "maintaining equity, popular control and realizing social justice were more important than economic efficiency" in those communities.[9] Threats to the allocation system were viewed as threats to the community and its way of life, more than as a threat to the individual water user.[10]

In the late nineteenth century, most western states' constitutions declared themselves to hold the waters flowing within the state for the benefit of the public (i.e., the citizens), and prior

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[7] Describing the historical changes in water law, Joseph Sax states:

> The story of water law is a record of continual change. At one time riparian law rested upon the natural flow doctrine. That doctrine was appropriate to, and supportive of, a pre-industrial society where the highest value of water was instream, for aesthetic, navigation and recreational use. As the industrial revolution got underway, and water as a source of power for mills became crucial, the natural flow doctrine (which effectively prohibited diversion of water from streams) gave way to the reasonable use doctrine, which permitted such abstraction. Reasonable use became the legal instrumentality of the industrial society's agenda as applied to water.

Id. at 9.

[8] H. Ingram & C. Oggins, *The Public Trust Doctrine and Community Values in Water*, 32 Nat. Res. J. 515, 530 (1992).

[9] *Id.* (citing A. Maass & R. Anderson, . . . And the Desert Shall Rejoice: Conflict, Growth, and Justice in Arid Environments (1978)). The authors point out that similar concerns also underlie much of the resistance to rural-to-urban water transfers among agricultural communities today. *Id.*

[10] H. Ingram, et al., *Replacing Confusion With Equity: Alternatives for Water Policy in the Colorado River Basin, in* New Courses for the Colorado River (1983).

appropriation evolved as the basic rule for acquisition of private water rights.[11] The prior appropriation system was developed during the westward expansion to maximize the full "beneficial use" of western waters, defined as the capture and diversion of waters for a range of utilitarian purposes. An important part of the prior appropriations doctrine is that a water right, once vested, is a usufructuary "property interest that can be sold, leased or otherwise alienated."[12] However, most western states also instituted a permit system allowing state oversight and control of water appropriation and transfers processes.

Water exchanges were perhaps the earliest form of water transfer in the west. One of the earliest laws authorizing exchanges was a Colorado statute enacted in 1897. Traditionally operated by agreement between miners and agricultural users, exchanges under Colorado law allow a trade in water sources so long as the same quantity is maintained downstream. Colorado law requires a fixed intention to take a specific amount of water from an identified source at a specific location for an identified beneficial use. The exchange is predicated upon simultaneous delivery of the amount taken to another identified location of the affected river system.

Historically, urban users could purchase water rights from rural users, although such transfers were the exception rather than the norm.[13] Today, transfer approval may be subject to public interest considerations, as defined by statute, by water rights administrators,[14] or the

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[11] The "first in time, first in right" maxim treated water resources on the public lands of the West as a form of commons, analogous to other unowned resources, such as game. For a brief summary of the history of the development of appropriative law in the West, *see, e.g.,* D. Tarlock, *From Natural Scarcity to Artificial Abundance: The Legacy of California Water Law and Politics, in* 1 West-Northwest J. of Envtl. Law, Policy Thought at 77 (1994).

[12] C. Bell & N. Johnson, *State Water Laws and Federal Water Uses: The History of Conflict, the Prospects for Accommodation*, 21 Envtl. L. 1, 5 (1991). The authors quote W. Hutchins' treatise on western water law on this point: "[T]he basic right of ownership and the divestiture of ownership [of appropriative water rights] was so well established in the early development of the appropriation doctrine in the West, and so consistently confirmed, as to be axiomatic." 1 Water Rights Laws in the Nineteen Western States at 468 (1971).

[13] Dan Tarlock writes: "Until recently, many believed that the allocation of western water was eternal. In reality, however, the allocation system was never completely static. It has always contained reallocation mechanisms to allow minor adjustments in use patterns. These adjustments--transfers in the shift of water from its initial use to another use--were, however, the exception rather than the norm. Today, the exception may become the norm." *Western Water Law: Global Warming, and Growth Limitations* in 24 Loyola of Los Angeles Law Review 979 at 986 (1991).

[14] *See, e.g.,* C. Bell & N. Johnson, *supra* n.12 at 15 (citing examples of states where water administrators "provide protection pursuant to public interest provisions" even though their statutes do not expressly define those interests).

courts.[15] Public interest criteria vary among the states, and are more likely to apply to new appropriations than to transfers.[16]

Beyond specific public interest criteria, some courts have recognized a public trust in water, and used the doctrine to reallocate water previously transferred in a private transaction pursuant to state law.[17] The public trust doctrine is often traced back to Roman origins;[18] however, a case can be made that it was part of traditional law and custom throughout much of the ancient world.[19] In the United States the doctrine was first applied to waters and beds of navigable waterways.[20] As early as 1870, the Oregon Court of Appeals recognized the existence

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[15] At least one court has required consideration of the public interest without express statutory language mandating it: e.g., *Clark v. Briscoe*, 200 S.W.2d 674 (Tex. Civ. App. 1947). *See generally* C. DuMars & N. Johnson, "A Survey of the Evolution of Western Water Law in Response to Changing Economic and Public Interest Demands," 29 Nat. Res. J. 347, 356-367 (1989) (discussing public interest criteria among the western states).

[16] "[U]ntil quite recently, the consideration of 'public interest' criteria in transfer proceedings was not required in most states. In fact, the language of most transfer statutes, which provides that a transfer *shall* be approved if it does not impair the rights of other appropriators, suggests that it was not proper to consider public interest criteria in transfer proceedings." G. Gould, *Transfer of Water Rights*, 29 Nat. Res. J. 457, 473 (1989) (emphasis original). *See generally* C. Bell & N. Johnson, *supra* n.12 at 6-10 (discussing public interest criteria among western states).

[17] The public trust doctrine, based on common law notions, is to be distinguished from the public interest, which is defined under state statute, regulation or case law.

[18] Under Roman law, certain natural resources were considered to be common property held by all the citizens, as Justinian's *Institutes* (an elementary treatise on Roman law first issued in 533 AD) states: "The things which are naturally everybody's are: air, flowing water, the sea, and the seashore." *Institutes* 2.1.1. (P. Birks & G. McLeod trans. 1987).

[19] *See generally* C. Wilkinson, *The Headwaters of the Public Trust: Some Thoughts on the Source and Scope of the Traditional Doctrine,"* 19 Envtl. L. 425 (1989) (finding variants of the doctrine in Chinese water law of 249-207 B.C., traditional Nigerian customs, Islamic water law; water law of medieval Spain and France, in Mexican and Spanish laws and institutions present in the New World, and among many Native American tribes).

[20] A landmark public trust case in the United States Supreme Court was *Illinois Central Railroad v. Illinois,* 146 U.S. 387 (1892). In that case, the Illinois state legislature had granted the railroad over 1000 acres of land beneath Lake Michigan. The land grant extended one mile from Lake Michigan's shoreline into the Lake and one mile along the central business district of Chicago. Four years later, the legislature rescinded the grant. The Railroad subsequently sued the state. The United States Supreme Court held that title to the lands underlying the state's navigable waters "is a title

of a public trust in water resources:

> [The] severe restriction upon the power of the state as trustee to modify water resources is predicated not only upon the importance of the public use of such waters and lands, but upon the exhaustible and irreplaceable nature of the resource and its fundamental importance to our society and to our environment.[21]

The doctrine has since been recognized by some courts as imposing "a duty of continuing supervision over the taking and use of the appropriated water."[22] The public trust doctrine has been judicially applied in some form to waters in the western states of Idaho,[23] Montana,[24] North

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held in trust for the people of the State that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties." *Id.* at 452. The Court upheld the legislature's repeal of the original grant, ruling:

> A grant of all the lands under the navigable waters of a State has never been adjudged to be within the legislative power; and any attempted grant of the kind would be held, if not absolutely void on its face, as subject to revocation. The State can no more abdicate its trust over property in which the whole people are interested, like navigable waters and soils under them, so as to leave them entirely under the use and control of private parties . . . than it can abdicate its police powers in the administration of government and the preservation of the peace.

Id. at 453.

[21] *Morse v. Oregon Division of State Lands*, 77 U.S. (10 Wall.) 557 (1870).

[22] *Nat'l Audubon Soc'y v. Superior Court of Alpine County*, 658 P.2d 709, 719 (Cal. 1983), *cert... denied*, 464 U.S. 977 (1983) (ruling that the state must consider public trust values when allocating title to state water resources unless state legislation specifically provides otherwise, and must also attempt to avoid or minimize any harm to public trust interests).

[23] There is some dispute as to the application of the public trust doctrine in Idaho water law. *See Idaho Conservation League, Inc. vl Idaho*, No. 21144 (1994), *reh'g argued* (1995) (characterizing the opinion in *Kootenai Environmental Alliance v. Panhandle Yacht Club*, 671 P.2d 1085 (Idaho 1983), as a plurality rather than a majority opinion; *but see* dissenting opinions by Bistline, and Johnson, J). *Kootenai* discusses the public trust as encompassing navigation, fish, wildlife habitat, aquatic life, recreation, aesthetics, and water quality values). *See also* S*kokal v. Dunn,* 707 P.2d 441 (Idaho 1985) (relying on *Kootenai).*

[24] *Galt v. Montana Dep't of Fish, Wildlife and Parks*, 731 P.2d 912-15 (Montana 1987).

Dakota[25] and California.[26] Examples of water-related natural resources to which notions of the public trust doctrine have been applied in state courts nationwide include: (1) nonnavigable tributaries of navigable waters in California[27]; (2) California's shore zone of navigable and nontidal Lake Tahoe[28]; (3) beaches above high tide in New Jersey[29]; (4) wetlands and state parks in Massachusetts[30]; (5) private lands around rapids or obstacles in Montana streams[31]; (6) all waters--not just navigable waterways--in Idaho,[32] Montana,[33] and North Dakota.[34] These rulings indicate that:

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[25] *United Plainsmen v. North Dakota State Water Conservation Commission*, 247 N.W. 2d 457 (N.D. 1976).

[26] *Marks v. Whitney*, 491 P.2d 374 (Cal. 1971), recognized individuals' standing to assert public trust claims. *National Audubon Society v. Superior Court of Alpine County*, 658 P.2d 709 (Cal. 1983), *cert.. denied* 464 U.S. 977 (1983), applied the public trust doctrine to protect public values in fishing, hunting, boating and swimming, and held that water appropriations can be reconsidered based on potential harms resulting to those values. *United States v. State Water Resources Control Board*, 182 Cal. App.3d 82 (1st D. Cal., 1986) recognized the public interest as encompassing water quality issues relating to water diversions affecting the San Francisco Bay and the Sacramento-San Joaquin Delta.

[27] *Nat'l Audubon Soc'y v. Superior Ct. of Alpine County*, 658 P.2d 709 (Cal. 1983), *cert. denied*, 464 U.S. 977 (1983) (NB: the doctrine was not found applicable to nonnavigable waterways (e.g., manmade reservoirs), in the absence of some impact on navigable waters).

[28] *State v. Superior Court of Placer County*, 625 P.2d 256 (Cal. 1981), *cert. denied*, 454 U.S. 865 (1981), *reh'g denied*, 454 U.S. 1094 (1981).

[29] *See, e.g., Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355 (N.J. 1984).

[30] *Robbins v. Dep't of Public Works*, 244 N.E.2d 577 (Ma. 1969).

[31] *Montana Coalition for Stream Access v. Hildreth*, 684 P.2d 1088 (Mont. 1984); *Montana Coalition for Stream Access v. Curran*, 682 P.2d 163 (Mont. 1984).

[32] *Skokal v. Dunn*, 707 P.2d 441 (Idaho 1985) (citing and quoting *Kootenai Envtl. Alliance v. Panhandle Yacht Club*, 671 P.2d 1085, 1988 (Idaho 1983): "The state holds all waters in trust for the benefit of the public and 'does not have the power to abdicate its role as trustee in favor of public parties.'").

[33] *Galt v. Montana Dep't of Fish, Wildlife & Parks*, 731 P.2d 912-15 (Mont. 1987).

[34] *United Plainsmen v. North Dakota State Water Conservation Commission*, 247 N.W.2d 457 (N.D. 1976) (under trust responsibility to conserve and protect present and future water supplies).

> . . . although the public trust doctrine is likely to exist in every state, each state may interpret it differently. Thus, western states are obligated to give adequate consideration to public trust interests in their administration and management of western water resources. This is so even where the public trust doctrine is currently latent.[35]

Thus, although the public trust doctrine may be implicated in transfers of water, the parameters of the doctrine are not entirely clear. This is illustrated by California's Mono Lake litigation which resulted in amending the water rights licenses issued to Los Angeles and restricting diversions from Mono Lake's tributary streams. A lawsuit was initiated in 1979 by the National Audubon Society, the Mono Lake Committee, Friends of the Earth, and others to stop diversions damaging Mono Lake and other natural resources, relying on the public trust doctrine as the primary legal theory. In 1983, the California State Supreme Court filed its unanimous decision, ruling that public trust values must be protected "whenever feasible," that no vested water rights prohibit this consideration, and remanding the decision granting water rights to Los Angeles for reconsideration under the public trust doctrine.[36] Nonetheless, when the same parties joined California Trout in a 1985 lawsuit, they argued that Los Angeles' water rights should be rescinded because they did not protect fish as required under the state Fish and Game provisions. The Court of Appeals ruled that Los Angeles must release enough water to re-establish and maintain the fisheries as required under the state's Fish and Game Code.[37] Later, all lawsuits concerned with Los Angeles' water diversions were combined in the Superior Court for El Dorado County. A final decision was eventually issued in 1994, recognizing Mono Lake as an Outstanding National Resource Water and establishing minimum lake levels and instream flows for fish protection, and periodic higher flows for channel maintenance and flushing purposes. The parties' eventual reliance on statute, despite the landmark *Audubon* ruling, suggests uncertainties about the parameters of the public trust doctrine. But the history of the litigation illustrates the fact that water transfers have the potential of being subject to scrutiny

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[35] C. Bell & N. Johnson, *supra* n.12 at 22.

[36] *National Audubon Society v. Superior Court*, 33 Cal.3d 419 (1983) stands for four primary points: 1) The State, as sovereign, retains continuing supervisory control over its navigable waters and the lands beneath those waters; 2) The State has an affirmative duty to take public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible; 3) As a matter of practical necessity, the State may have to approve appropriations despite foreseeable harm to public trust uses; 4) The public trust imposes a duty of continuing supervision over the taking and use of appropriated water, and the State is not confined by past allocation decisions which may be incorrect in light of current knowledge or inconsistent with current needs. Points summarized by T. Birmingham, *Mono Lake: A Retrospective*, ABA 13th Annual Water Law Conference proceedings (1995).

[37] *California Trout v. State Water Resources Control Board,* 218 Cal. Ct. App. 187 (1985).

within a framework of policy concerns imposed under notions of the "public trust."

B. Synopsis of Current Law Relating to Transfers

Water's essential characteristics led to its unique place in western law, being both a commodity subject to private ownership and control and a form of community property--"something in which the community has a stake and which no one can fully own."[38] Commodity theories of full privatization which apply under the U.S. Constitution to all other forms of state resources in interstate commerce have been found inapplicable to water.[39] By the end of the nineteenth century, "states declared themselves the owners of their waters in trust for the public (their citizens) in order to establish prior appropriation as the fundamental ground rule for the acquisition and exercise of private rights."[40]

Many states have enacted additional area-of-origin protection and other "public interest" statutes recognizing and protecting community interests in water. Indeed, there is growing evidence today that western states' water law is increasingly influenced by considerations related

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[38] J. Sax, *Understanding Transfers: Community Rights and the Privatization of Water, in* West-Northwest J. of Envtl. Law, Policy, Thought 13 (Spring 1994). Elsewhere, Sax writes:

> . . . Water, as a necessary and common medium for community development at every stage of society, has been held subject to the perceived societal necessities of the time and circumstances. In that sense, water's capacity for full privatization has always been limited. The very terminology of water law reveals that limitation: terms such as beneficial, non-wasteful, navigation servitude and public trust all import an irreducible public claim on waters as a public resource, and not merely as a private commodity.

Sax, The Constitution, Property Rights and the Future of Water Law 11, Western Water Policy Project Discussion Series Paper No. 2, University of Colorado Natural Resources Law Center (1990).

[39] *See, e.g., Sporhase v. Nebraska ex rel. Douglas*, 458 U.S. 941 (1982)(holding that Nebraska could override property claims or claims that water was simply a commodity, at least where there was a demonstrable need for the water in the area of origin); *Hudson County Water Co. v. McCartier*, 209 U.S. 941 (1908)(perhaps, in the words of Joseph Sax, the "earliest example of court action holding that ordinary contract principles were not sufficient to govern water marketing." *Understanding Transfers: Community Rights and the Privatization of Water*, 1 West-Northwest J., *supra* n.38 at 14).

[40] C. DuMars & D. Tarlock, *Symposium Introduction: New Challenges to State Water Allocation Sovereignty*, 29 Nat. Res. J. 331, 332 (1989).

to equity, or to water's "communal" value: that is, to considerations of a fuller range of potential impacts, beyond the two parties to a transfer transaction.[41] For example, California conditions certain transfers on a finding of no adverse environmental effects. Thus, the legal status of water "is very unusual, and it applies to virtually nothing else."[42]

All states retain some degree of oversight of water transfers. Certain changes in the point of diversion, place or purpose of use generally take place under existing water rights, subject to the water right administration finding "no injury" to other lawful water users.[43] Short-term and seasonal transfers are often informal and do not involve state review. However, many transfers involve administrative or judicial approval. Long-term transfers usually require approval, and permanent transfers are generally subject to state review.[44] All western states allow objections to change applications, although the standing required to raise objections and the objections which may be recognized vary among the states.

States have instituted both barriers and incentives to transfer. In general, appropriation rights must be used in order to remain legally valid.[45] Thus, in certain respects, the notion of transfers is inconsistent with the "use-it-or-lose-it" principle of the appropriation doctrine.[46] Yet, in recent years, various forms of legislation and modifications of traditional appropriative law have been enacted which facilitate market transfers of water. Despite considerable development in the area of facilitating transfers, however, various legal and institutional impediments to transfers remain. The synopsis below provides a brief overview of various legal impediments to transfers.[47]

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[41] *See generally* Ingram & Oggins, *The Public Trust Doctrine and Community Values in Water,* 32 Nat. Res. J. 515 (1992).

[42] J. Sax, *Understanding Transfers: Community Rights and the Privatization of Water,* 1 West-Northwest J. of Envtl. Law, Policy, Thought at 14 (1994).

[43] *E.g.,* California water law defines temporary transfers as those lasting for one year or less. Cal. Water Code § 1725 (Supp. 1994).

[44] Transfers of pre-1914 rights in California and Nevada are not subject to state review.

[45] Pre-1914 rights in Nevada cannot be lost through forfeiture.

[46] *See generally* C. Bell & N. Johnson, *supra* n.12 at 5 ("[T]he use-it-or-lose-it principle . . . penalizes nonuse by forfeiture, in order to preclude speculative claims and assure protection of the public interest in the continuous beneficial use of water.").

[47] This paper discusses the approaches facilitating transfers in the section III, "Current Approaches to Facilitate Intrastate Water Transfers."

i. Traditional Impediments to Intrastate Transfers

Several primary legal limitations on transfers stem from appropriation doctrine. Foremost among these is the "no injury" rule. This rule generally prohibits any transfer that injures other lawful water users. However, standing requirements to protest water transfers vary considerably. In Montana, standing is limited to downstream water rights holders. Colorado, Nevada and Utah law do not require protestants to hold water rights.[48] The question of standing in Arizona is unsettled.[49] Most states allow the transfer to be approved whenever the transferee voluntarily mitigates any injuries to other recognized rights; however, the expense involved may often be prohibitive.

Water districts and water projects often own senior rights to large volumes of water and frequently limit water transfers within their boundaries. The laws enacted to enforce these institutional controls, and contracts under which project waters are allocated and transferred are a subject unto themselves.[50] Legal and contractual limitations on transfer of projects waters generally are enforced under state auspices unless another law, exercise of state public interest authority or new project construction can pre-empt them. For example, municipal water districts in Utah cannot sell their water rights. Conservancy districts in Wyoming cannot transfer water outside their boundaries, unless the boundary is amended. Irrigation districts can petition the court to amend boundaries to accommodate water transfers. Wyoming law requires a party requesting a change in the point of diversion and means of conveyance to obtain consent of the "other owners" of the ditch associated with both the old and new uses. In Arizona, irrigation and agricultural districts and water users' associations possess an absolute veto power over proposed transfers within their boundaries. Idaho does not permit changes or transfers of water rights represented by shares of corporate stock without the corporation's consent. New Mexico

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[48] In *Bonham v. Morgan*, Utah's Supreme Court ruled that a protestant's claim may not be dismissed simply because the protestant does not hold water rights, and that any interested party has standing to protest a change application. 102 Utah Adv. Rep. 8 (Utah 1989).

[49] The relevant sections of Arizona law are §§ 45-172 and 45-156(b).

[50] This paper focuses on transfers under state law and related to instrastate transfers. Federal water projects and associated water districts must be evaluated in context of applicable legislation and district or project policies and regulations. For discussion of federal limitations on transfers, *see, e.g.*, Water Transfers: More Efficient Water Use Possible, If Problems are Addressed (GAO/RCED-94-35); Water Markets: Increasing Federal Revenues Through Water Transfers (GAO/RCED-94-164); B. Driver, *Sources of Water II: Federal Water Projects*, in Moving the West's Water to New Uses: Winners & Losers (University of Colorado, Natural Resources Law Center summer proceedings 1990). The Western States Water Council has previously published a study which addressed transfers from federal projects, entitled: Water Efficiency: Opportunities for Action (1987).

allows ditch companies to object to transfers of their water shares in transfer proceedings.

Other barriers can also be presented by these special water districts and water projects. The uncertain relationship between districts and members or beneficiary water rights titles makes it difficult to ascertain ownership for transfer purposes. This uncertainty also inhibits financial incentives to both districts and members to encourage transfers. Further, this institutional arrangement creates conflict between the district's interest in self-preservation and the state's interest in fostering flexible and equitable transfers.[51] There is often another level of conflict between landowners and the district itself.

A fundamental impediment stemming from traditional appropriative water law arises under the beneficial use doctrine. Generally, waters that are not beneficially used are subject to forfeiture under state appropriative law.[52] While an appropriative water rights transfer was considered to carry with it the right of alienation, as an incident of ownership, the beneficial use requirement led to concerns that transfers might similarly lead to forfeiture, since, by implication, a transferor was no longer exercising his right. Thus, intermediate appropriators have challenged the basis of new approaches allowing the sale or lease of water rights and conserved water, claiming that senior appropriator's unused water should belong to them, and not be capable of being acquired by junior or new appropriators For example, these kinds of concerns apparently resulted in the enactment of reduplicative statutes reiterating that temporary transfers of water to the California drought water bank would not result in the forfeiture of water rights.[53]

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[51] *See* B. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 Cal. L. Rev. 671 (1993) (identifying interrelated technical and institutional barriers to transfers).

[52] *See, e.g.,* C. Bell & N. Johnson, *supra* n.46 at 5 (describing the role of forfeiture under the "use-it-or-lose-it" rule of appropriations doctrine).

[53] In 1979, the California Legislature adopted statutes declaring conservation and transfer of water to be beneficial uses of water under the law, and prohibiting forfeiture of water not used as a result of these practices. Cal. Water Code § 1011(a) (West Supp. 1994). Despite these anti-forfeiture guarantees, the State Water Resources Control Board "heard testimony that some water users may be afraid to transfer water for fear of prejudicing their water rights." State of California, Report of the Governor's Drought Action Team 29 (1991). Threatened with circumstances of extreme drought and seeking to encourage transfers to the Water Bank , an "Extraordinary Session" of the Legislature was convened in spring of 1991. Two additional statutes with sunset provisions were enacted, one of which reinforced the existing anti-forfeiture guarantee, here in the specific context of drought-related transfers: "No temporary transfer of water made pursuant to any provision of law for drought relief in calendar years 1991 and 1992 shall affect any water rights." 1991 Cal. Stat. ch. 2X § 1(a).

ii. Barriers to Transfers Based on the Public Welfare

In most western states today, transfer applications can also involve consideration of a broad range of potential effects. For example, while original concerns for instream flows were limited to navigation and power generation purposes, today a broader range of purposes for instream flows are recognized, encompassing waste disposal, recreation, and fish and wildlife uses. In fact, evaluation of transfers' effects may involve any of a number of "public interest" factors under state law, policy, regulation or case law, which may include: fish and wildlife habitat, aquatic life, navigation, recreation, aesthetic beauty, water quality, minimum instream flows, access to public waters, discouraging waste, and promoting conservation.

The "public interest" is variously defined and interpreted. Wyoming allows the State Board of Control to consider economic losses to the community and state related to the proposed transfer, the extent to which those losses would be offset by benefits from the new use and the availability of other sources of water. California requires that the transfer of conserved or unused water not "unreasonably" affect fish, wildlife or other instream beneficial uses or the economy of the area from which the water is to be transferred. New Mexico requires that water transfers are not detrimental to the public welfare or water conservation.[54] Proposed transfers in Utah must also pass a public interest review.[55]

The processes by which public interest review of transfers takes place also varies among western states. The processes for public interest review can be determined by statute or by administrative discretion. In several states, the water administrative agency routinely evaluates the public interest when approving transfer applications. In other states, formal objections by members of the public are the primary means for asserting public interest concerns, with the administrative agency responding to claims asserting the public interest.

Issues related to waters' areas of origin give additional bases for public welfare-based barriers to transfers. Riparian doctrine, although not a primary form of water law in the west, can act as a barrier to transfer. A similar obstacle to transfers can be encountered when ground water resources are involved. Ground water transfers may face scrutiny under statutes protecting areas of origin from unwanted hydrological, environmental and economic consequences of transfers.[56] Such statutes may give areas of origin a veto power over potential transfers.

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[54] NMS 72-12-3(D), 7(A)(1985).

[55] *Bonham v. Morgan*, 102 Utah Adv. Rep. 8 (Utah 1989). The case announced that change applications are subject to the same guidelines as initial applications under Utah law.

[56] *See, e.g.*, Arizona's Groundwater Code, Ariz. Rev. Stat. §§ 45-651-655.

III. APPROACHES TO FACILITATE INTRASTATE WATER TRANSFERS

Against the backdrop of various laws and doctrines imposed to protect both private and public values in water rights from the effects of transfers, there has been a contrasting and growing interest in facilitating transfers to accommodate changing demands on water resources. This development has raised new questions about how to best accommodate the changing needs of society. The primary questions revolve around the extent to which a free market system can accomplish desirable changes in resource allocation, and the extent to which administrative oversight is advisable. The following discussion considers various approaches to accomplishing transfers intrastate.

A. Market Approaches to Water Transfers

A marketing program requires identifying potential trading opportunities, designing and negotiating agreements among parties, completing economic valuations, hydrology, engineering and other studies, and assessing potential impacts. Transfer agreements can offer a wide flexibility potential. Key aspects may include the duration of the commitment; whether it is conditional or continual, and whether the supply is reliable or unreliable. A market premium may be assessed for supplies which are reliable, such as supplies which are least likely to be affected by drought. Water rights with a senior priority can be marketed at a premium. Indeed, the relative priority of a water right can be marketed separately from the water right itself; that is, a "consent-not-to-sue" agreement can be bought from senior rights, making those priorities subordinate in dry years. With treatment costs rising, a market premium can be assessed for water supplies of exceptional quality, or waters of lesser quality can be discounted. Finally, market values can be exchanged for benefits other than money, such as storage rights or other benefits from a new water project.[57]

Economic theory suggests that water markets would provide financial incentives for reallocating water to its highest economic uses. In order for this to happen, three conditions must be satisfied:[58]

a) The seller must receive a price offer that equals or exceeds the economic benefits sacrificed in transferring water. For example, a farmer must consider the net returns to water from irrigation, any decreases in the value of land, improvements, and equipment due to reduced water availability, and expected

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[57] R. Smith, *Reserved Water Rights as an Economic Asset, in* Proceedings of 1994 Indian Water Conference, Stanford Law School.

[58] B. Colby, *Sources of Water I: Agriculture -- The Deep Pool?*, Moving the West's Water to New Uses: Winners and Losers (University of Colorado Natural Resource Law Center, summer program 1990).

appreciation of the value of the water right over time.[59]

b) The buyer must expect economic returns from the water right purchase (which may be contributions to a manufacturing process, investment returns, or profits from real estate development) to exceed costs associated with the purchase.

c) The buyer must view market acquisition of water rights as an economically attractive method of obtaining water, relative to other possibilities, such as new supply development or contracting with existing organizations.

Market transfers that satisfy these conditions can result through one of two resource allocation institutions. The first is a decentralized institution in which the resource is obtained by all users within a competitive market, and competitive forces result in a market price which reflects the resource's relative scarcity. This is a free market with self-directed forces of supply and demand to control the marketing of goods and to set prices. The second is a centralized institution in which the resource is controlled by a central manager who knows the value of the resource; and then, either directly allocates water so as to equate value and the scarcity (or other ultimate) value of water; or makes the resource available to users at a price which equals that value. A centralized institution can bring public welfare factors into consideration. Although complete consensus about the relative advantages of these two institutional approaches has not yet emerged, certain key inadequacies of the decentralized market in administering important values of water suggest that a centralized institution is preferable.[60]

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[59] This criterion would be difficult or impossible to apply in cases where the transferor had not, in fact, put the water to beneficial use and was facing forfeiture, and where there is no apparent alternative use of the water to the seller. In this case, the seller would be entitled to only speculative opportunity costs, at best (i.e., the value of the water in speculative alternative uses).

[60] Arguing for a largely unregulated free market approach, one author states:

> Voluntary market transfers benefit buyers and sellers. Buyers can obtain water supplies more inexpensively than from new project construction. Sellers are compensated at a rate greater than the profit they would have realized from retaining the water. Because water is moved to where it has greater economic value, productivity in the region encompassing the buyer and seller is increased. Transfers also have the benefit of increasing the efficiency of use of water . . . . For transfers to be efficient, those transferring water must not be allowed to injure the water rights of other water rights holders, unless those injured parties agree to accept compensation. . . . Similarly, there needs to be some vehicle for protecting water uses that do not normally participate in market transactions, but that provide economic benefits, such as fish and wildlife and instream uses.

i. The Decentralized Model: Limited Applications for Water Transfers

The first model of a purely competitive market does not describe the water transfers market as it now exists or is likely to exist in the foreseeable future, for several reasons. First, the ideal conditions of the decentralized, competitive market model are usually lacking in private water markets. Second, the competitive market model does not accommodate the impacted public values of water outside the four corners of a transfer agreement. Western states' recognition of the public value of water underlies their retained authority to oversee water transactions. Governments will likely continue to maintain oversight mechanisms to moderate the transfers market and limit undesirable secondary consequences of transfers as the competition for water supplies grows. The discussion below more fully describes these two main inadequacies of the purely competitive model for the water transfers market.

a) Market limitations of the decentralized, model for water transfers

A purely competitive market functions to allocate resources according to supply and demand. Where a number of factors exist, a purely competitive market can function effectively. These elements include: well-defined property rights; many sellers and more buyers; perfect mobility (as it relates to small transaction costs); and perfect information. The inapplicability of these ideal market conditions to water transfers is examined below.

R. Wahl, *Market Transfers of Water in California, in* West-Northwest J. of Evtl. L., Policy, Thought at 51 (Spring 1994).

On the other side of the debate, Joseph Sax emphasizes that the importance of protecting the public interest in water effectively means that transfers cannot be governed by the market place alone:

> In a recent report, the National Research Council observed that water markets cannot be expected to resemble more conventional markets for a variety of reasons, including the long-held tradition that water resources support a wide variety of public uses. [citation omitted] Transfers can impose significant third-party effects, which must be accounted for in any reallocation. If transfers are to achieve their potential, the report said, the decision-making process should bring all relevant third parties into the deliberation. This broad participation is necessary because water is a unique resource, different from other commodities. Markets alone cannot accurately reflect all the relevant values of water. I share these conclusions. . . . The future of water transfers will be jeaopardized unless something like that broader and more inclusive model is embraced.

J. Sax, *Understanding Transfers: Community Rights and the Privatization of Water, supra* n.48 at 13.

Well defined property rights. The four characteristics of well defined property rights are: ownership, complete specification of rights, transferability, and enforcement. However, risk and uncertainty often associated with water transfers begin with problems with determining the property rights in water to be transferred. Water rights are generally considered a "quasi-exclusive" property right.[61] In that water rights are a right to use water, rather than ownership of the water itself, property rights in water differ from familiar forms of personal or real property. Further, water rights can take a number of forms. They can be embodied in a courthouse filing or decree, in a license or permit issued by a state agency, in a mutual water company or district stock share, in a water delivery contract with a local, state, tribal or federal agency, in ownership of riparian land,[62] or in a pattern of historical use without written record. Each of these forms of water rights can be subject to particularities when transfers are sought. Due to the variety of forms of water rights, it is often difficult to identify trading partners for water transfers.[63]

Other difficulties can also be encountered in determining the quantum or the seniority of a water right. Water supplies and demands are inherently variable, depending upon user behavior, the season of the year, precipitation levels and climate factors. The problem of "associating quantities of paper water to real water is a difficult technical problem."[64] Even if accurately represented at the time of transfer, the agreed-upon terms may later be politically or socially altered. For example, instream flow requirements may be imposed to provide for the recovery of endangered fishes under the Endangered Species Act. Thus, the accurate specification of a water right to be transferred can be difficult to determine initially, and to guarantee thereafter.

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[61] A perfected water right acquired under the appropriation doctrine is generally considered an "usufructuary" right to use water, a "quasi-exclusive property right (not tied to the locus of use)." C. DuMars & D. Tarlock, *Symposium Introduction: New Challenges to State Water Allocation Sovereignty*, 29 Nat. Res. J. 331 (1989).

[62] Only a few western states have some form of riparian water rights: namely, California, Arizona and Texas. However, western states generally have an exemption from appropriative law for existing wells used for domestic purposes, which are assumed to transfer with the deed to property, unless the deed specifies otherwise.

[63] Some states have informally developed institutions to help identify trading partners. In New Mexico, for instance, many water rights trades involve the services of an intermediary who helps bring trading partners together.

[64] J. Lund & M. Israel, *Water Transfers in Water Resource Systems,* 121 J. of Water Resources Planning and Management 193, 200 (1995). The authors cite problems with agricultural users identifying the actual quantity of water they use, or how much water would really become available if land were fallowed or cropping patterns altered; with assessing evaporation and seepage losses as the water travels through complex conveyance and storage systems; and with establishing the hydrologic independence or interdependence of water sources. *Id.*

Many Sellers and Buyers. The water market is not generally characterized by many buyers and sellers, as the ideal competitive model would require. Instead, the water market exhibits a high degree of concentration on both side with a few parties as buyers or sellers in a disproportionate number of transfers. This limited market participation precludes competitive market operations of the supply and demand functions in setting prices. Also, most transfers are from agricultural to M&I uses, limiting the examples transferring parties can draw from in setting terms and prices. Furthermore, water transfers "can emerge from various forums: bipartisan or multilateral negotiations, several forms of brokerage and bidding, and other means."[65] In this respect, the water transfers market differs from many familiar forms of market transactions that involve only a buyer and seller.

Mobile Resources (as related to small transaction costs). High transaction costs, coupled with uncertainties about the success of attempts to transfer water rights and the possible existence of physical impediments to readily accessible transferred water, impede the mobility of water resources. From a physical standpoint, "[t]ransferred water must typically be conveyed and pumped to a new location, often stored, and commonly treated . . . [which] may require modifying the operation of existing water infrastructure."[66]

Substantial transaction costs can also be incurred resolving uncertainties about the ownership, extent, and priority of given water rights, identifying and resolving potential third-party impairments or other externalities associated with proposed transfers. These costs may be in the form of consulting fees required to verify ownership and to obtain a physical description of the water rights for purposes of the proposed transfer. Some purchasers require verification of ownership of water rights before they apply for a transfer. For example, Albuquerque requires the prospective seller of a water right to submit a complete abstract of title together with any document indicating there was an appurtenant right which has not been severed from the land or assigned to another owner. A title search may be required, and if an adjudication decree for water is absent, a declaration of water rights ownership may be needed, requiring submission and evaluation of a survey map.[67] If the transfer is protested, costs of a protest hearing or litigation will be incurred. Often the services of an attorney are involved in a title search, examination of departmental records, resolving disputes among trading partners, and walking an application

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[65] *Id.*, 195.

[66] *Id.*, 201. The authors note that, in some instances, the transaction costs involved in a transfer "may exceed the cost of the water itself." *Id.*

[67] The high transaction costs associated with resolving uncertainties about the ownership, extent, and priority of given water rights can be decreased when a centralized institution is in place which provides a clearinghouse of information regarding water rights. However, other transaction costs will likely be increased under the centralized model, such as accounting for third party impacts and costs associated with the permitting process.

through the administrative process. Costs are much greater when the protest goes to the courts.

Information Availability and Exchange. The fourth requirement for a competitive market is the availability of reliable information and its exchange. The uncertainties, risks and costs associated with water transfers are, in the end, largely the result of inadequate information on water rights to be transferred. No established clearinghouse exists for information on suppliers and seekers of water rights in western states, nor of potential protestants to transfers. Few brokers have expertise in the exchange of water rights. Thus, buyers and sellers must be prepared to incur significant "search costs" if they want to be well informed as to options regarding these rights. Market information is a function of the frequency with which buyers and sellers participate in the market. As more water transfers occur, more information should become available about the identity of buyers and sellers, their expected bids and offers, the identity of market intermediaries and the fees such intermediaries charge, and the water managers' procedures for transfer approval. The ready availability of accurate information would lower transaction costs. Government agencies could play a key role in overcoming the problems of information availaility and exchange in water markets, through implementation of certain relatively minor administrative and legislative changes.

b) Nonmarket disadvantages of the decentralized model for water transfers

The second major inadequacy of the decentralized model pertains to nonmarket values which the competitive market model can likely never accurately represent. Some of the most critical problems with water transfers are secondary effects, incident to the transaction. Transfers may impact cultural and social aspects of human life and other biological systems dependent on the current distribution of water.

Overlooked or under-represented aspects of water transfers are particularly critical because of water's essential nature. A recent GAO report on water transfers states:

> While many market transactions affect third parties in some way, many economists and others involved in water markets believe that water differs from most commodities because of the nature of its impacts. These impacts affect individual holders of water rights, local communities, and the environment. In addition, unless significant adverse impacts are addressed, those concerned about third-party impacts may impede transfers through litigation or oppose water markets through political influence.[68]

Market-driven resource allocations will follow income distribution. Many studies have

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[68] Water Transfers: More Efficient Water Use Possible, If Problems are Addressed (GAO Report to the Chairman of the Senate Subcommittee on Water and Power, Committee on Energy and Natural Resources 1994).

addressed the equity issues particularly raised in the context of rural-to-urban water transfers. For example, transfers of water rights from irrigation to tax-exempt municipal water agencies may erode the local tax base of the formerly irrigated area. Agricultural communities are also concerned about losing the rural quality of life they value when water is transferred to urban users.[69] In summary, market-driven transfers may adversely impact a host of environmental and economic values beyond the bargaining table.

ii. Overcoming Limitations of the Transfers Market

The limitations of the unrestrained, competitive free market system described above point out the advantages of maintaining centralized institutions to govern water transfers. Centralized institutions offer the opportunity to provide the oversight, management and control needed to overcome the limitations of the water transfers market and to bring important externalities and third-party impacts into the transfer equation. Transfers can be temporary arrangements, permanent, or contingent upon the occurrence of certain events. This section will consider ways of incorporating market transfers and oversight functions to achieve equitable and efficient water transfers with a minimum of third party and environmental effects, and utilizing existing institutions and laws.

a. Facilitating Transfers of Stored Water: Capacity Sharing[70]

In the western United States, a large and viable irrigation industry with property rights to unregulated stream flows was firmly established before many large dams were built.[71] Today, many water rights holders share capacity rights in a common reservoir.[72] This constitutes a form

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[69] *See, e.g.,* Brown & Ingram, Water and Poverty in the Southwest (1986) (arguing that unfettered water markets will threaten both environmental quality and the rights of non-urban constituencies by ignoring non-economic values of water); Folk-Williams et al., Western Water Flows to the Cities (1985); DeYoung & Jenkins-Smith, *Uncertainty in the Western Water Markets: An Assessment of Policies and Potentials*, in Water Marketing: Opportunities and Challenges of The New Era (1986) (concerned with water markets as sources of increasing social conflicts).

[70] The primary points of this discussion are from N. Dudley, *Water Allocation by Markets, Common Property and Capacity Sharing: Companions or Competitors?*, 32 Nat. Res. J. 757 (1992).

[71] The Bureau of Reclamation and the Army Corps of Engineers have capacity to store over 170 million acre-feet of water. The Bureau has constructed about 103 million acre-feet of active reservoir capacity in the west, of which it operates about 87 million acre-feet. The rest has been turned over to contractors to operate. B. Driver, *Sources of Water II: Federal Water Projects*, Moving the West's Water to New Uses, *id.*

[72] Between 1933 and 1944, more than 5000 dams were constructed, more than doubling the storage capacity of the nation's reservoirs. Between 1945 and 1969, more than 35,000 dams were

of common property, which--not to be confused with open access--provides for "exhaustive partitioning of the resource among title holders."[73] States' fostering of capacity sharing concepts could provide a way for reservoir management to facilitate voluntary transfers between rights holders.

In 1987, the Western Governors' Association unanimously adopted recommendations that the Department of Interior should issue a policy statement to facilitate voluntary transfers of water provided by the Bureau of Reclamation and calling for a comprehensive review of the effect of reclamation policy on voluntary reallocation. In 1988, Interior announced the water marketing policy statement requested by the governors. In 1989, Interior issued "Voluntary Water Transactions Criteria and Guidance."[74] In it, Interior expressed an intent to resolve conflicts with state policies affecting transfers on an ad hoc basis, but to generally use state law as the primary mechanism for protecting sellers/lessors of water and third parties affected by transfers. It also stated that the Bureau of Reclamation will explore transfers as alternatives to new storage facilities if proposed facilities imply federal financial support.

Given these factors and the benefits obtainable, states might profitably adopt policies favoring capacity sharing in reservoir contract renegotiations. Capacity sharing provides for multiple decision makers while keeping communication problems internalized within one decision making entity. It provides each user with secure long-term title to a percentage share in the capacity or empty space of a reservoir and a percentage share of its inflows and reservoir losses. Surpluses or shortages of water flowing into a reservoir can be shared without changing the users' basic allocations of the water in the reservoir. Shares can be freely transferred between buyer and seller. Some users could operate as a single group, while others could be suballocated to group users. Capacity sharing can be readily extended to multiple purposes such as instream, recreational and environmental uses, flood control and urban uses, as well as irrigation.

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built, over twice as many as had been constructed in all previous years. The nation's storage capacity rose by 170% and off-stream water use more than doubled. Dam construction peaked in the mid to late 1960's, with more than 2000 dams completed annually from 1965 to 1969. Correspondingly, irrigated lands in the 17 western states increased from 19 million acres in 1944 to 35 million acres in 1969. From 1970 to 1982, annual rates dropped to 1069 dams. With the best sites already developed, costs of increasing safe-yield within a basin rose sharply. K. Frederick, *Changing Demand for Water in the West*, Moving the West's Water to New Uses: Winners and Losers (1990).

[73] J. Paterson, *Rationalized Law and Well-Defined Water Rights for Improved Water Resource Management*, Renewable Natural Resources: Economic Incentives for Improved Management 48 (OECD ed., 1989).

[74] *Id.*

Allowing the water stored in the users' share of reservoir capacity to be transferred through a water market confronts users with the full opportunity costs of water.[75] The capacity sharing concept gives users with various levels of risk aversion the flexibility to manage subsystems in accordance with their individual financial strategy without unduly interfering with the behavior of other water users or reservoir management. Cooperative decisions relating to common property are more durable when the decision-making group is small.

From the reservoir management perspective, accurate modeling of water supply and demand are essential. The capacity sharing concept centralizes planning decisions in a single decision maker who determines available quantities. This allows supply and demand to be modeled together, instead of separately. The capacity concept generally allocates shares on a percentage basis rather than in quantified terms, thus simplifying determination of the water rights' holders allocations available for transfer.[76] It internalizes coordination and communication decisions and jointly optimizes reservoir and farm management and planning decisions to maximize expected regional net revenues from water use.[77]

b. Contingent Water Marketing and Conditional Lease-Backs

Transfers from one use to another (usually from agricultural to municipal or hydropower uses) can be made dependent upon priorities and available supplies through contingent water markets and conditional lease-backs.[78] The conditional lease-back has been the traditional transaction for securing water supplies for use during dry-year shortages or to meet future needs. Under this arrangement, municipalities or other major water purveyors will purchase irrigators' water rights by either purchasing blocks of irrigation district shares[79] or by making standing

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[75] Opportunity costs of water are its values in alternative uses.

[76] Reservoir management should not be unduly tasked in situations of wheeling through a reservoir; that is, where water inflows are earmarked for a particular user.

[77] Seasonal operation decisions need to be optimized before long-term planning decisions about reservoir and distribution system capacities, and the size of the servicing area, can be optimized.

[78] These options have limited value for municipal and industrial uses where a firm year-round supply is necessary to support urban development, or in areas in which agriculture is not a primary existing use of water.

[79] *See, e.g.,* Water Intelligence Monthly 6 (Feb. 1991)(reporting that the North Weld Water District purchased 200 Colorado-Big Thompson units in February 1991 for drought insurance to be leased out in non-drought years).

offers to purchase water rights.[80] The water is leased back to agricultural sellers during non-drought periods or until the future need arises.

Contingent water marketing operates via an "option contract" giving the buyer temporary use of the water whenever a given contingency (e.g., drought) occurs over the contract period. The seller (e.g., farmer) retains ownership of the water right and receives the normal supply when the option is not exercised. This innovative "dry year option" approach differs from permanent transfers in that the (usually) agricultural user retains ownership of the water rights but leases out water during dry periods. This approach protects long-term stability of the agricultural sector by retaining agricultural water rights and delivering full supplies during normal rainfall years, while relieving water budget pressures on other water system components in years when supplies are below average.[81]

These optional and conditional delivery agreements can help maintain the hydrological system (which depends on deep percolation) when delivery is only occasional. However, as the frequency of expected interruption increases, persistent reductions in recharge can result in third-party damages. Dry year options require resolution of certain other issues. They may be unattractive to farmers who need more certainty when planning for long-range farming operations. Farmers face considerable uncertainties in planning crop rotations, marketing strategies, equipment leases, and input purchases. It is important to carefully define the conditions under which the option will be exercised. Farmers also must be ensured compensation for lost crop revenues when the option is exercised, as well as for disruption of farm planning and land use patterns, in addition to any production and marketing expenses incurred prior to being notified that the option would be exercised that season. The terms and timing for notification are important issues to irrigators.[82]

Although contingent markets have not yet developed to a significant degree, there are

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[80] *See, e.g.,* Water Strategist Monthly 126 (Nov. 1990)(reporting that Albuquerque purchased waters from Sandoval and Socorro Counties irrigators for future municipal use. The waters would be leased back to the farmers at no charge for 10 years. Farmers desiring to extend leases beyond 10 years (2000), will have to pay market prices for the water.).

[81] *From* R. Huffaker, N. Whittlesey, P. Wandschneider, *Institutional Feasibility of Contingent Marketing to Increase Migratory Flows for Salmon on the Upper Snake River*, 33 Nat. Res. J. 671 (1993).

[82] *See* B. Colby, *Sources of Water I: Agriculture -- The Deep Pool?*, in Moving the West's Water to New Uses: Winners and Losers (University of Colorado Natural Resources Law Center, summer program 1990).

examples of such arrangements.[83] One long-term lease option, purchased by a city in Utah for $25,000, was exercised during three dry seasons in the first 25 years of the contract. The agreement required the purchaser to pay the irrigator an additional $1000 and provide 300 tons of hay for any year the option was exercised.[84]

c. Exchanges Among Water Sources

Allowing exchanges between water sources promotes flexibility in water use and can encourage use of available surface water, saving essentially nonrenewable ground-water supplies for years when streamflow is low. In some states, farmers are encouraged to use treated effluent as irrigation water so that higher quality water sources are freed for uses that require it.

Exchanging priorities is another type of transfer which can help certain water users to secure highly reliable supplies during drought years. It is useful for municipalities and industrial users whose demand levels are relatively inelastic. This option has substantial potential with Indian reserved rights, due to the early priority date of most of these rights.

d. Water Banks

Water banks provide an institutional setting to facilitate transfers. Water banks operate to

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[83] A study performed in the 1980s researched contingent water marketing in Idaho as a means for increasing "firm" power production in the Snake River system. The goal of a contingent water market in the study setting was to increase available water in low-flow years by shifting water from irrigation to hydropower use. The study stipulated that farmers would not be required to sacrifice more than 50% of normal consumptive use in any year. Maximum contractual delivery would be required only during extreme low-flow conditions, with lesser amounts required when below-average flows were available. Maintaining an average flow of 8,042 cfs would require interruption of irrigators' supply in 19.6% of the years included in the historical record. Only 2 years a century would require all the contract water. Two other years would require 82% and 70.5% of the total contract amount, while seven other years would require lesser deliveries. The researchers assumed at least 900,000 acres of farmland would have water rights which are sufficiently secure to participate in the water market. This acreage was estimated to be capable of providing about 625,000 af of water in a drought year under the presumed conditions. Estimated hydropower utilities benefits from the agreement were found to be about nine times greater than lost farm income. Investigating the economic feasibility of using marketed water to provide additional flows for fish, with power production a residual benefit from increased flows, the researchers estimated that the value of power resulting would be about twice the estimated farm income lost. J. Hamilton *et al.*, *Interruptible Water Markets in the Pacific Northwest*, 71 Amer. J. Agric. Econ. 63 (1989).

[84] *Cited in* Shupe et al, *Western Water Rights: The Era of Reallocation*, 29 Nat. Res. J. 413, 419 (1989).

either 1) organize short-term leasing of water; 2) store water in designated facilities; or 3) preempt negotiated transactions in a field of water trading.[85] The first type of bank is most common. The California Department of Water Resources water bank operates during periods of drought, remarketing water to buyers under specific critical needs allocation rules. Idaho operates the Boise Water Bank and Upper Snake River Water Bank, organizing annual leasing of water among irrigators and municipal users. The Idaho Water Resource Board operates a water supply bank for natural flow and storage water rentals. Local rental pools for the rental of storage water operate pursuant to the Board's authority in the Boise, Payette, and Upper Snake River basins. Washington State operates the East Columbia Basin Water Bank to organize leasing among irrigators. Texas has created a state water bank to offer water rights for sale or lease. The other two types of water banks have been proposed by various interests to resolve questions about Colorado River allocations.[86]

Water banks can serve various functions. They can help control transaction costs, identify and "match" buyers and sellers. Water banks can also concentrate economic power to set the terms and conditions of trades for the benefit of one side of the transaction, or bring significant externalities into the bargaining equation. As the California drought water bank demonstrated, they can also be used to allocate priorities in times of drought.

B. Experience to Date

As indicated, western states have employed various approaches to facilitating transfers. The following is a sampling of these experiences.

i. Arizona's experience with transfers[87]

Water transfers in Arizona primarily relate to "water farms." Although surface water transfers must be approved by the state, Arizona law historically required no state approval of

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[85] *See* discussion of drought water bank *infra* section II B. *See generally* "Water Banking: Facilitator of Trade or Mechanism of Control?" *in* 8 Water Strategist 2 (July 1994) (endorsing free market over water banking as mechanism for water transfers).

[86] The second type of bank is represented by the Bureau of Reclamation's proposed banking regulations for the Lower Colorado Basin. The third type of bank is represented by various banking proposals among Lower Colorado River Basin states. Nevada has proposed a publicly-controlled water bank to collect and distribute water entering interstate transactions in the Lower Basin, providing short-term, long-term, and emergency supplies and mitigation support. Arizona has proposed separate state water banks to transfer Lower Basin waters inter- and intrastate.

[87] The majority of this discussion is derived from National Research Council, Water Transfers in the West: Efficiency, Equity, and the Environment (1992).

ground water transfers, and recognized no connection between ground water pumping and streamflows. In 1948, the city of Prescott bought farmland in Chino Valley and developed a well field to provide water for domestic use, which local farmers protested exceeded the amounts needed for agriculture, causing declines in the basin. In the 1970's , Tucson bought and retired over 21,000 acres of farmland located in the Avra Valley, at an average price of just over $1,000 per acre. These purchases caused concern in their areas of origin and provoked numerous lawsuits under the reasonable use doctrine. The doctrine, which was the only limitation on transfers, allowed unlimited withdrawals for use on the overlying land. By the end of the 1970s, the state was running a ground water overdraft of between 2.2 and 2.5 million acre-feet per year.

In 1980, Arizona implemented the Ground Water Management Act, which was intended, among other things, to limit ground water pumping levels to eliminate overdraft by the year 2025 and to foster the gradual conversion of agricultural water use to urban uses. The Ground Water Management Act made ground water freely transferable, subject to damages. It placed the major burden on agricultural and municipal users to conserve water and created economic incentives to transfer water from agricultural to urban uses, reflecting conscious allocation choices to a greater degree than most other state water allocation legislation. It established no mechanism for evaluating, conditioning, approving or disapproving transfers from rural areas. As a result, an unregulated market in rural water as a source for urban population growth and expansion was created.

The primary incentive to transfers in the 1980 act was the requirement that no new land development may occur without the developer's guarantee of an assured water supply to meet anticipated needs for at least 100 years. Imported water came to be viewed as a major source to meet this requirement. Considerable controversy resulted from large-scale purchase of water farms encouraged under this requirement, leaving many third parties vulnerable to costs of transfers, especially areas of origin and environmental values. A survey of leaders in rural areas found most of them believing that waters originating in their watershed belong to their area, and that substantial losses resulting from removal of such waters cannot be compensated by fiscal transfers.[88] Construction of the Central Arizona Project reduced but did not eliminate the need for ground water.

In 1988 and 1989, Arizona tried to rectify some of the conflicts between rural and urban users by designating certain rural ground water basins as urban reserves, and withdrawing others by designating them as environmentally sensitive areas. The bill limited the ability to transfer groundwater. Later, in 1991, the legislature joined area-of-origin protection with supply augmentation, and authorized creation of a replenishment district for the Phoenix area, with authority to levy taxes to restore ground water, and required to use taxes to replenish CAP water

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[88] C. Oggins and H. Ingram, "Does Anybody Win? The Community Consequences of Rural-to-Urban Water Transfer: An Arizona Perspective," Issue Paper No. 2, Univ. of Arizona Udall Center for Studies in Public Policy (1990).

before searching for additional supplies. The legislation imposed a ground water transportation fee schedule ranging from $3 to $30 per acre-foot and permits "voluntary" payments in lieu of property taxes to the area of origin. However, the replenishment district was never formed.

Finally, in 1993, the legislature returned full circle, restricting transfers of ground water beyond overlying lands, which are now specifically defined in the law. Two replenishment districts were authorized and created for the areas of Phoenix and Tucson.

Arizona's Supreme Court in 1989 made effluent a major source of transferrable water. In *Arizona Public Service Co. v. Long*, the court ruled that treated effluent is a water source separate from surface and ground water, and that it may be sold by municipalities, over downstream users' objections, subject only to the beneficial use requirement. Effluent is expected to become the major source of water for golf courses and perhaps for Indian water rights, especially since the US EPA and the Arizona Department of Environmental Quality set higher water quality standards for effluent released into surface streams subject to the Clean Water Act.

Since the Central Arizona Project (CAP) was completed, marketing of its water supplies has been an issue of considerable discussion. The current manner of allocations and contracts makes it difficult to transfer allocations between users, except on a limited basis. However, recent Indian water rights settlements have included leasing of Indian CAP water to non-Indian users as a critical component of the settlement plan. The marketing plan seeks to reduce irrigation district debt in exchange for water allocations.

The Governor's CAP Advisory Committee identified several elements containing marketing components. These include: developing a spot market for surplus water; marketing of allocations by upstream water exchange subcontractors; placing the entire Colorado River entitlement under more secure contract arrangements; allocating additional water to users located near the Colorado River; leasing water to the federal government for Yuma desalinization plant makeup water; debt forgiveness in exchange for non-Indian agricultural water allocations; purchase or dedication of CAP allocations from subcontractors to create a water supply pool for use in additional Indian water rights settlements; allowing marketing of unused settlement water off-reservation; and assisting in resolution of settlement disputes. Each of these elements involve selling or leasing CAP water within Arizona to help solve a variety of issues. However, current legal and institutional arrangements make it difficult to implement many of these potential solutions.

Current provisions in agricultural and M&I subcontracts provide only limited ability to market CAP water. It can be sold or exchanged by the subcontract only on a year-by-year basis. The subcontractor is not allowed to make a profit on the sale. The transfer must be approved by the Conservancy District and the Bureau of Reclamation.

Direct sale or lease of Indian CAP water allocations is constrained by federal law. However, Congress has sanctioned certain off-reservation long-term lease arrangements,

including settlements for several tribes in Arizona. Generally, leasing entities are responsible for payment of OM&R charges when water is leased for M&I purposes, but capital costs are deferred as if the Indians were using the water directly. Since Indian contracts generally have an equal priority with M&I contracts in the state, Indian leases are useful in demonstrating an assured water supply under the Ground Water Code.

Non-Indian agricultural contracts have a lower priority than M&I or Indian contracts. Generally, these junior subcontractors are entitled to water left over after the higher priority users have taken what they need. This amount could range from over one million acre feet to zero in times of shortage along the Colorado River. A CAP marketing discussion paper suggests that these supplies could be made more marketable if they were converted from a percentage of the unused supply to a fixed quantity, particularly since their lower priority makes them less attractive as municipal assured water supply.[89] It further suggests that the firmness of these supply would be greatly enhanced if they are used in conjunction with a ground water recharge program so that stored water is used as a backup when river shortages limit direct CAP deliveries.

The state is looking at ways to use surplus waters, since projections indicate that CAP available supplies will exceed orders for the next 20 to 30 years.[90] Surplus waters may be made available for the development of a short-term or spot market. Such a market might be attractive to intermittent users, such as agricultural users, recharge projects and replenishment districts. Spot markets could also be used as a source for interim supplies.[91]

ii. The California Experience with Transfers[92]

a) California Drought Water Bank

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[89] Draft discussion paper entitled "Marketing of CAP Water Within Arizona (May 26, 1993) (on file with author).

[90] *Id.*

[91] Arizona recently proposed a water bank to market its Colorado River allocation to Nevada and California, as well as within its own boundaries. At present, Arizona is using up to 1.6 million acre-feet of its annual 2.8 million acre-feet allocation. The Arizona Department of Water Resources would operate the bank, with legislative action needed to acquire water rights. Unused allotments would be put into a special category for marketing. Funds to acquire the water would come from a legislative appropriation and be repaid by the water bank or from revenue bonds with water contracts for security. The proposal was presented to all seven members of the Colorado River Compact in July 1994. A technical subcommittee was appointed to review the proposal and report its findings later in the year.

[92] This discussion was provided by Jeanine Jones, California DWR.

The California Department of Water Resources (DWR) began its involvement in water banking with emergency drought water banks in 1991 and 1992, responding to critical water needs in what were then the fifth and sixth years of a severe statewide drought. The banks were established as part of the Governor's drought response actions; no new authorizing legislation was entailed.

Water banking in this context means a process whereby DWR buys water from willing sellers or pays water users to forego use of a portion of their supplies, and remarkets the water to buyers under specific critical needs allocation rules. DWR's costs of administering the drought water bank are to be borne by the purchasers of transferred water. Since many water transfers involve conveyance of water from northern California to other areas served by the State Water Project (SWP), additional separate agreements may be negotiated for DWR to transport the water through SWP facilities to the transferees.

In 1991, the drought water bank purchased about 820 TAF of water which, after deducting 165 TAF for carriage water in the Sacramento-San Joaquin River Delta, amounted to 655 TAF of water used to meet critical demands or for SWP carryover storage. Sources of this water included land fallowing (just over half of the total supply), reservoir storage purchases, and ground water substitution arrangements. The 1992 drought water bank, implemented under less severe hydrologic conditions, purchased about 190 TAF of water from reservoir storage and ground water substitution arrangements.

DWR subsequently prepared a program environmental impact report (EIR) to cover a state-run drought water bank involving short-term (typically one year or less) transfers during drought periods over the next 5 to 10 years. (DWR's water banking program does not cover long-term or permanent transfers, and is not a substitute for long-term water management planning.) The EIR focuses on use of ground water substitution arrangements and reservoir storage purchases if projected drought year water demands are less than about 200 to 300 TAF, with voluntary fallowing of agricultural land then being used to meet larger demands. Most of the supplies available for purchase come from agricultural water users in the Sacramento Valley, northern San Joaquin Valley, and the Delta. Purchasers include urban water users in the San Francisco Bay area and Southern California, agricultural water users on the west side of the San Joaquin Valley, and some wildlife refuges.

The water bank was successfully implemented in 1991, 1992, and 1994 (1993 was a wet year). Although work to form a 1995 bank did begin in late 1994, it subsequently became apparent that 1995 would be a wet year and the bank was not activated.

California's very dry winter (October 1993 through April 1994), coupled with severe restrictions on export pumping from the Sacramento-San Joaquin Delta, resulted in major cutbacks in water deliveries to SWP and Central Valley Project contractors.

David N. Kennedy, Director of the Department of Water Resources, signed a resolution on June 20, 1994 establishing the 1994 drought water bank. The water bank purchased about 221,800 acre-feet of water from twelve sellers and allocated approximately 174,000 acre-feet to satisfy the critical needs of fifteen buyers. The remaining water was used as Delta outflow to provide for water quality protection (43,800 acre-feet), and as a prudent reserve (4,000 acre-feet).

In order to make water available to the 1994 water bank, willing sellers either pumped ground water to replace surface water, or they released water stored in local reservoirs. All sellers were located north of the Sacramento-San Joaquin Delta (see map). Agencies with critical water supply needs included agricultural, municipal and industrial agencies in the San Francisco Bay area, the San Joaquin valley, and southern California.

In anticipation of a dry 1995, the Department of Water Resources organized a 1995 drought water bank in September 1994. By November, fourteen California water agencies had signed contracts to purchase water from the bank if needed to meet critical needs. The Department then formed the 1995 bank in an inactive status, pending activation if 1995 precipitation was below normal.

While in an inactive status, the water bank purchased water supply options on 29,050 acre-feet of water from five willing sellers. These options, acquired at a price of $3.50 per acre-foot, could be exercised by the Bank at a price varying between $36.50 and $41.50 per acre-foot (excluding the option payment). If not used by the bank to meet critical needs in 1995, the options would be transferable outside the Bank to other agencies needing additional water suppliers. If the options were not exercised by May 1995, sellers would keep the $3.50 per acre-foot option payment.

As a result of an abundance of precipitation and snowpack throughout the state, the Department did not need to exercise the acquired options to meet critical needs in 1995. Efforts to transfer the options to water agencies outside the Bank found no buyers, due to the year's above-normal hydrologic conditions.

b) The Central Valley Project Improvement Act of 1992

The Central Valley Project (CVP) Improvement Act of 1992[93] made significant changes to water management authorities associated with this U.S. Bureau of Reclamation (USBR) project -- allowing for the first time, the transfer of water to lands outside the project. The CVP's typical deliveries are on the order of 7 MAF, with about 80% of that amount going to agricultural use. Urban and environmental water users are expected to be the primary buyers of transferred water.

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[93] Title 34 of Public Lax 102-575.

The act's key water transfer provisions are:

- Individuals or districts receiving CVP water under water service, water rights, or repayment contracts may make transfers, on a willing buyer/willing seller basis, to non-project users. (Historic CVP practices already allowed the transfer of water within the project.)

- All transfers are subject to USBR/US Fish & Wildlife Service review and approval. Transfers involving more than 20% of project water under a contract to a district or agency are further subject to review by the contracting district. CVP water users have the right of first refusal with respect to transfers outside of the project, and may buy the water proposed to be transferred under the same terms and conditions for which it is being offered outside the project.

- Transfers must be consistent with state law. The water that may be transferred is limited to water that would have been consumptively used or irretrievably lost to beneficial use. (Both these provisions sunset in 1999. The intent behind sunsetting is unclear).

- USBR/US Fish & Wildlife Service may not approve transfers that adversely affect fish and wildlife or local ground water conditions, or that cause unreasonable third-party impacts in the transferor's service area.

- Repayment of transferred water to USBR shall be at the greater of full cost or cost of service rates (agricultural users), or cost of service or municipal and industrial rates (M&I users). Additionally, a transfer fee of $25/AF (1992 dollars) is imposed on M&I transfers to non-project users. The transfer fee is credited to CVPIA's restoration fund for fish and wildlife mitigation and enhancement purposes.

USBR has to date prepared interim guidelines for its review and approval of CVPIA transfers, and has recently begun the formal rule making process to promulgate these interim guidelines as regulations. Although the CVPIA's water transfers program has engendered much discussion, no transfers have yet been actually approved and implemented.

In addition to this water transfers program, the CVPIA further gives USBR explicit authority to purchase water on a willing seller basis to meet fish and wildlife water needs specified in the act. A short-term, year-to-year water acquisition program is underway now; the 1994 goal for the program was to acquire about 100 TAF. Details of a long-term water acquisition program are in the planning stages.

iii. Colorado's Approach to Transfers[94]

Most surface water in Colorado is appropriated. Water reuse is the norm, particularly in the eastern parts of the state. Rights to return flows are protected. Colorado's high mountains and continental divide unevenly split its water resources. The Colorado River and its tributaries on the West Slope drain approximately one third of the state, but receive nearly 70% of the state's precipitation. The Arkansas and Platte River systems drain the eastern half of the state, yet receive only one third of the state's rainfall. At present, nearly 40 transmountain water diversions have been constructed to supply agricultural, municipal and industrial users on the East Slope. Most are less than a few hundred acre-feet; the half dozen large-scale projects were built by municipalities or water conservancy districts.

Since new transmountain diversions are now very difficult to develop, urban growth has created pressures to transfer water from agricultural lands to urban centers. In the 1930's Denver began buying cattle ranches from South Platte, which contains the headwaters of the South Platte River, and transferring the irrigation water to meet urban needs. Irrigated South Park acreage has declined from 35,000 acres in 1969 to 4,000 acres in 1991. Similar effects have been seen in other counties of Colorado. Between 1975 and 1984, 858 applications were filed seeking a change in water use. About 70% involved a shift from agriculture to nonagricultural uses. As of 1988, 80% of the transfer applications had been approved.

Colorado case law supports a water right owner's ability to transfer water rights and make changes in use, subject to the "no injury" rule. Colorado courts in transfer proceedings consider the scope of the original right and how it was exercised. Water decreed but not historically used cannot be transferred. Several categories of water rights exist under Colorado law, and the ability to transfer them differs somewhat. Although, a strong property-rights based view of water in the state has facilitated voluntary transfers, conditions may be imposed on the transfer to protect other water users. Recent Colorado legislation authorizes the water court to require revegetation of land from which irrigation water is removed. The court retains jurisdiction over the transfer until revegetation is accomplished.

Colorado water law allows and encourages irrigation water users to conserve water through improved efficiencies in order to provide a better irrigation water supply on the adjudicated acres under the specific system. Colorado water law does discourage efforts to market conserved or saved water when the proposal results in the alteration of return flows to the

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[94] The material for this section is derived from G. Silkensen, "Windy Gap: Transmountain Water Diversion and the Environmental Movement," and T. Rice & L. MacDonnell, "Agricultural to Urban Water Transfers in Colorado," *in* Colorado Water (October 1994) and L. Morandi, "Rethinking Western Water Policy: Assessing the Limits of Legislation," National Conference of State Legislatures (1994).

detriment of downstream water rights. These water rights are dependent upon the return flows for a portion of their water supply, which is the situation in most of Colorado.

Efforts to allow the marketing of conserved water failed during both the 1992 and 1993 sessions. The bills provided for measuring conserved water on the basis of reduction in the amount diverted. Certain opponents of the legislation argued that it violated Colorado's constitutional provision that beneficial use is the measure of a water right. Colorado case law supports the view of a "duty of water" as the basis of a water right.[95] This position suggests that the quantity of a water right is based on the amount of water needed to grow a particular crop, not the decreed quantity that is actually diverted. Other opposition was based on concerns about impairing existing rights to return flows. Even with some protection built into the bill, agricultural interests contended that they would have to protect their rights through litigation in water court. There was also concern about granting conserved water the same priority date as the original water right, rather than the most junior-most right on the stream.

iv. Idaho's Approach to Transfers and Instream Flows

Idaho has established a state water supply bank to facilitate short-term transfers from irrigation districts and individual irrigators.[96] Terms and conditions are subject to approval by the Department of Water Resources. Idaho law provides for temporary transfers by agricultural interests in a given year. Leasing rights automatically revert to the original use and location when the lease expires. Statutes protect leased waters from abandonment or forfeiture.[97] Irrigation districts have the right to approve any temporary transfers of district waters, and can themselves reallocate water over the short term.[98] Lease payments belong to the district. Water rentals are issued in the order the rights were leased to the bank. One-tenth of the proceeds are allocated to cover the bank's administration costs.

An important provision allows the Water Resource Board to appoint local committees to facilitate leasing of stored water through locally operated rental pools. Most of Idaho's water

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[95] Colorado courts have defined a "duty of water" as "that measure of water which, by careful management and use, without wastage, is reasonably required to be applied to any given tract of land for such period of time as may be adequate to produce therefrom a maximum amount of such crops as ordinarily are grown thereon." Farmers Highline Canal & Reservoir Co. v. City of Golden, 272 P.2d 629, 634 (Colo. 1954).

[96] 1979 legislation ratified bank operations which had been occurring for 60 years. Idaho Code 42-1761 *et seq.*

[97] Idaho Code 43-341 and 42-1764.

[98] Idaho Code 43-108 and 43-335.

renting is done by local committees.[99] Idaho municipalities have not yet created a significant demand for agricultural water. Committee procedures must be approved by the board, and must: determine priorities among competing applicants; schedule reimbursements for leasing; set rental prices and administrative charges; allocate unrented water; prevent injury to other water rights; protect the local public interest; be consistent with conservation goals.

Idaho law limits the permanent transfer of conserved water to new uses. Transfers must be evaluated under the "no injury" rule and to ensure that they do not enlarge the original right. The latter criterion effectively precludes reallocation of conserved water because the rate of flow, total volume of the diversion and of water consumed, and the extent of beneficial use cannot be exceeded. Instead, conserved water returns to the stream for use by junior appropriators, unless it is leased through the state's water supply bank.

The relationship between conserved water and a water right is being disputed in the Snake River Adjudication. Some irrigators have reduced their water use to one quarter of the amount decreed over fifty years ago and want to claim full rights to the decreed amount. The state has recommended that the court reduce the allotments to more accurately reflect current use.

In 1992, an Idaho law was enacted to increase "fish flush" water to protect salmon runs.[100] However, there is considerable opposition in the state to reallocating agricultural water to instream flows. The legislation addresses this concern by authorizing the state water supply bank "to augment flows in and out of the state of Idaho for salmon migration, provided said flows are used for power production purposes within the state of Idaho." It expressly disclaims any legislative finding that rental or use of water for augmentation for salmon flows constitutes a beneficial use of water, is in the public interest, or whether such use injures existing water rights. The statute was passed by the legislature to assure that Idaho fairly contributed toward a regional coordinated effort to enhance salmon migration provided that other parties were making a proportional contribution to solving the salmon migration problem." The statute, as amended in 1994, is effective only until 1996.

v. New Mexico's San Juan-Chama Project and Instream Flow Issues

The city of Taos, New Mexico, has a contract for water from the San Juan-Chama project, but cannot take the water because it is upstream from where the Rio Chama joins the Rio Grande. Instead, Taos takes delivery of an equivalent amount of water out of the Rio Grande River near Taos. Concerns have emerged about reduced flows for local communities and loss of riparian plans and wildlife between Taos and the confluence with Rio Chama.

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[99] Most leased water has gone to hydropower uses.

[100] Chapter 101, Idaho Code 42-1763A.

vi. Nevada's Truckee-Carson Basins[101]

The Truckee River flows from Lake Tahoe in the Sierra Nevada Mountains of California, and the Carson River flows out of the Sierra Nevada Mountains south of Lake Tahoe. The two rivers flow into the Great Basin in Nevada, where they serve metropolitan Reno-Sparks, the Truckee-Carson Irrigation District in Fallon, Nevada, and Native American and wildlife uses. The rivers drain into Pyramid Lake and the Lathontan marshes, the Stillwater, Carson Sink and Carson Lake Marshes, respectively. The lower Truckee-Carson basins receive about 9 inches of rain per year, and surface supplies have been fully appropriated by adjudications initiated during the reclamation area. About 90% of the water rights are dedicated to agricultural use.

Creative transfer processes have arisen to resolve intense water allocation conflicts that have arisen between traditional and nontraditional users in the area. Conflicts abound between municipal and industrial users and irrigators (both Indian and non-Indian). Aboriginal fisheries and wildlife maintenance also compete for water rights in the area. Conflicts are being resolved through litigation, legislation, voluntary transfers, and consensus-building processes.

Four major water transfers addressed primarily nontraditional needs of the area since 1989. The Newlands Project transferred agricultural water to the Stillwater National Wildlife Management Area for wetland maintenance, under a private transaction. The Newlands Project also transferred water to the Truckee meadows for urban use, a voluntary transfer of ownership within the basin. Third, the Newlands Project transferred agricultural water to Pyramid Lake Tribe for cui-ui fish species protection. This involved an involuntary transfer effected through a change in Bureau of Reclamation operations, requiring increased irrigation efficiencies from farmers. Finally, an involuntary transfer from Stampede Reservoir to Pyramid Lake for cui-ui species protection resulted from litigation.

A significant price incentive has overcome the reluctance on the part of many area farmers to sell their water rights. The price for water rights in the Reno/Sparks area have risen over the past two decades from less than $750 per acre-foot to between $2,500 and $300 per acre foot. The majority of water rights acquisitions have been purchased by WESTPAC, the municipal water supply division of Sierra Pacific Power.[102]

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[101] The materials for this section are primarily derived from D. Tarlock, *The Role of Market Transfers in the Accommodation of New Uses: A Case Study of the Truckee-Carson Basin*, in Moving the West's Water To New Uses, *supra*; and National Research Council, Water Transfers in the West: Efficiency, Equity, and the Environment (1992).

[102] Nevada has also recently instituted a ground water protection program. Increasing use of Colorado River Water in southern Nevada has allowed for a decrease of ground water use from overdrafted aquifers. Colorado River water is now being used in these areas to recharge ground water aquifers. Nevada law specifically regulates projects for the recharge, storage and recovery of

vii. Oregon's Program for Transfers Relating to Instream Flows

Oregon legislation recognized instream flows as a beneficial use of water rights in 1987. The law also establishes a lease-back program for water leases to be held in public trust by the Oregon Department of Water Resources. In the first lease-back arrangement under the law, a farmer, who has irrigated 50-acres with diversions from the Deschutes River since 1986, exchanged his right to irrigate in 1994 for $6,600 of hay from the Oregon Water Trust so that instream flows could be maintained to benefit spawning steelhead trout.[103] In the past, the stream would nearly dry up when the farmer claimed his water rights. The Oregon Water Trust is working on similar leases elsewhere in the state. It was formed in 1993 through a three-year, $370,000 grant from the Northwest Area Foundation of St. Paul, Minnesota.

A recent instream flow pilot project has been undertaken in Oregon by the Bonneville Power Administration (BPA) and the Environmental Defense Fund. BPA signed a three-year lease/purchase option with an irrigator in Malheur County, Oregon allowing 16,000 acre-feet of diversion rights to be transferred to instream flows in the Snake River. It will test whether water purchases can increase flows for salmon, reduce energy costs and air pollution, and help agriculture. The BPA is developing other marketing and leasing agreements in the Columbia Basin aimed at voluntary reallocations of water for various environmental needs.[104]

viii. Washington's Trust Water Rights Program

Historically, the streams of the Yakima River basin sustained six large anadromous fish runs. Today, all of these runs are in serious decline, and several are approaching extinction. The water of the Yakima River and its tributaries has been fully appropriated since the beginning of this century and, in most years, present rights to water exceed supply.

Instream flow requirements were imposed on the Yakima River system in 1990 under the *Acquavella* general adjudication to preserve the anadromous runs needed to meet the Yakima Nation's claims for fish maintenance. There have also been several federal and state legislative attempts to resolve the conflicts between power, irrigation, tribal and fishery interests in the Basin. However, the conflicts remain largely unresolved. For example, in September 1994, the U.S. Ninth Circuit Court of Appeals invalidated the Northwest Planning Council's "Strategy for

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water. *See* NRS 534.250 through 534.340. Recent legislation authorizes the State Engineer to establish a program that allows a public water system to use ground water not otherwise permitted in a designated basin, where a domestic well rightholder becomes a customer of the water system and voluntarily ceases to use his domestic well. *See* NRS 534.350.

[103] *From* U.S. Water News, Vol. 11, No.3 (Sept. 1994).

[104] *From* Journal of the Bonneville Power Administration (Aug. 1994).

Salmon" for inadequate protection of fishery interests as required under the Northwest Power Act of 1980.[105] The suit was filed by the Yakima Tribe and several public interest groups.

As part of the state's attempt to protect the states's water resources, trust water rights programs were developed for water resource inventory areas of the state.[106] All trust water rights are managed by the Department of Ecology. Transfers for trust water rights are voluntary and may be temporary or permanent. They may be obtained through dry year lease options, conservation of water, gift or purchase. They can be reallocated either instream or offstream, subject to certain limitations. The state offers funding support for approved water conservation projects. Current regulations allow the Department of Ecology to make up to a 30% grant and up to 90% loans to cover project costs.[107]

Two provisions address concerns of irrigation districts: 1) districts proposing transfers must demonstrate that they represent the interests of water rights holders in approving the transfers; 2) the district must approve any transfer by rights holders it serves. A district's refusal to convey conserved water must be based on "probable adverse effects on the ability of the district to deliver water to other members or on maintenance of the financial integrity of the district."[108] Irrigation districts are eligible for financial assistance to cover part of the costs of constructing conservation facilities.

Transfers of conserved water have the same priority date as the original water right. Trust water rights are not subject to forfeiture for nonuse by the water-right holder.[109] Guidelines issued pursuant to the legislation limit transferable waters to water which has been beneficially used, providing: "Only that water which has been beneficially used in a reasonable manner may be considered for transfer."

As of mid-1994, no conserved water had been transferred into the trust program, although a conservation proposal from one irrigation district was under negotiation.

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[105] *Northwest Resource Information Center v. Northwest Power Planning Council* (9th Cir. 1994).

[106] The Yakima basin program is codified at Chapter 90.38 RCW. The program applying to other areas of the state is codified at Chapter 90.42 RCW.

[107] *See generally* Trust Water Rights Program Guidelines, Publication #92-88, Washington State Department of Ecology (Sept. 10, 199).

[108] Wash. Rev. Code Ann. 90.42.030.

[109] Wash. Rev. Code Ann. 90.42.040.

IV. ISSUES RELATED TO INTRASTATE WATER MARKETING

A. Who Should Be Entitled to Make an Intrastate Water Transfer?

This paper has focused on transfers or leases of water by the holders of the associated water rights. However, there is also significant interest westwide in the allowability and management of transfers initiated by water users who are not holders of the associated water rights. This circumstance is commonly seen among water users who have a contractual entitlement to a water supply developed by another entity (e.g., the Bureau of Reclamation (USBR) or a local irrigation district) which holds the actual water rights to the supply developed.

Consider, for example, a federal reclamation project. The USBR normally holds title to project water rights. USBR contracts with water districts within the project service area, and these districts in turn contract with individual water users. Normally, USBR does not allow transfers of project water outside a project's boundaries. (However, year-to-year administrative transfers of proejct water have been historically permitted among water districts within a project service area. These transfers, actually adjustments to deliveries provided under contractual entitlements, often respond to short-term water management needs such as those created by droughts or by constraints on water storage or conveyance.) Districts typically do not permit individual water users to transfer their contractual entitlements outside of district boundaries--especially if the transfer is perceived to be a "for profit" action by the water user--or, at a minimum, subject the transfer to a right of first refusal by the district. In particular, districts are often concerned about cumulative impacts of multiple transfers of contractual supply outside their service areas.

How does an individual water user in this circumstance effect a transfer of contractual entitlement? The answer to this question is still evolving, and the subject of user-initiated transfers is not without controversy. Issues associated with such transfers span mutiple categories: for example; public policy (establishing mechanisms to protect third parties and the public interest), administration (change in place of use of water held under a state-granted right), and water management (increased ground-water extraction to compensate for surface supply transferred. As noted previously, recent legislation has permitted user-initiated transfers of Central Valley Project water outside of project boundaries, subject to a right of first refusal by water users within the entire CVP service area. Such transfers must also be approved by the affected water district if the service entails more than 20% of project water under contract to the district. These provisions of the Central Valley Project Improvement Act represent one approach to responding to public interest concerns associated with specific user-initiated transfers. More broadly, given the many uncertainties now associated with such transfers, stakeholders in these actions may seek amendments to state water rights administration statutes to clarify the status of user-initiated transfers.

All water rights holders are equal in the marketplace, unless limited by contractual, administrative or legal constraints in the exercise and/or transfer of a particular water right. For example, unresolved issues regarding transfer of federal reserved rights held by Native Americans still exist and appurtenance requirements limit the transfer of some water rights.

State interest in water marketing has been stimulated by the Supreme Court's decision in *Sporhase v. Nebraska ex rel. Douglas*.[110] The case suggests states could maintain allocative primacy if they are market participants. Some states (e.g., California, Montana, New Mexico, South Dakota) are exploring this opportunity, seeking to acquire rights and sell the water as users or distributors in order to allocate their waters to preferred uses.

B. What Types of Water Rights Should be Transferrable?

In general, many states are moving toward facilitating the transfer of water rights, in an attempt to free up water to move to new uses. However, as water transfers become a greater force in reallocating waters, it has been suggested that states may want to classify water rights as more or less freely alienable, depending upon the public welfare served.[111] However, such restrictions run contrary to the historical system of water allocation based on transferrable property rights to water. A more commonly accepted approach to protecting the public interest involves well defined public interest criteria applied to all transfers. Under this approach, all water rights are transferable, but subject to public interest review.

C. What Role Should State Regulatory Entities Play in the Transfer Process?

Water managers have a number of choices when reviewing a change or transfer application. They may impose conditions on transfers to minimize interference with other uses. Such conditions may include restrictions on duration or season of use, limitations on well depth, specification of the zone from which well production may draw, or limits on use or the total diversion allowed. They are frequently required to weigh public interest criteria which influence whether the application should be granted and under what conditions so as to minimize impacts on water quality or quantity, instream uses, or other factors.

The broader range of concerns, now implicated with fully allocated water supplies and changing demands, has led several states to grant a broad range of discretion to water agencies. Water agencies have traditionally acted to protect existing rights holders in the context of proposed transfers. Now many water agencies conduct public interest reviews of change

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[110] 458 U.S. 941 (1982).

[111] Tarlock suggests that not every water right should be classified as eligible for acquisition. *The Role of Market Transfers in the Accommodation of New Uses*, *in* Moving the West's Water to New Uses: Winners and Losers (1990).

applications to protect public values. This places a heavy burden on state administrators. This, in turn, has raised difficult questions as to who is best qualified to conduct the balance of values necessary to resolve the public welfare equation, and specifically which forum is adequate to evaluate and resolve the difficult, multifaceted issues involved in transfer proposals.

D. How Should Third Party Impacts be Mitigated (Including Public Interest Concerns)?

Because western water law generally treats water as a form of property right, transfer proceedings subject to public interest review have focused on mitigating potential impacts by conditioning transfers, instead of preventing transfers from taking place. Various forms of mitigation have been imposed under state law. For example, Colorado law requires water districts to provide compensatory storage for transfers out of the Colorado Basin. However, the law does not apply to municipal transfers out of other areas of origin.

Planning processes may assist in mitigating third party effects. For example, New Mexico has enabled water planning entities to formulate regional water plans. These plans will be submitted to the state engineer to identify the values water provides in each region, project future water needs, direct public hearings on water issues in each region and define public welfare through the rule-making process. Montana has also established a regional water advisory committee which is developing a planning document to resolve water shortages among eight irrigation districts, three Indian reservations, a national wildlife refuge and a town. The planning document will be incorporated into the state water plan.

Public interest provisions can allow considerations of broader interests, such as community or environmental impacts, to be addressed in the transfer approval process. In this regard, several states have defined interests (beyond those of other directly affected water rights holders) as within the scope of public interest review.[112] Legislative guidance would appear to be particularly appropriate on setting forth public interest review standards and authority. Literature addressing the difficult issue of resolving third-party impacts and other effects of water transfers includes the following recommendations, many of which have been implemented by the states:

a) Recognize effects on:
- instream values (fisheries, recreation, aesthetics, vegetation and water quality)
- groundwater recharge
- local effects of transfer outside area of origin

b) Design ways to offset or prevent deleterious third-party effects by, for example:

[112] An overview of strategies to address third-party impacts and minimize impediments to equitable transfers was recently published in a GAO study of water transfers.

- establishing a mitigation/compensation fund with revenues from fees assessed on all transfers
- incorporating interests historically left out of the decision making process for water transfers, such as rural communities, ethnic minorities, fish and wildlife and their habitats, and the public.

c) Provide for instream flow protection.
- Minimum flow regimes can be developed for particular streams and lakes.
- Allow transfer approvals to be reopened for renegotiation if unacceptable instream impacts become evident.

d) Eliminate appurtenance requirements for agricultural lands water transfers.

ii. Administration of Transfers Affecting Instream Flows

One of the most difficult tasks facing water managers is instream flow administration. Since appropriative water law historically required a diversion for perfection of water rights, instream flows were not considered a "beneficial use." As environmental and recreational demands for instream flows have increased and as streams have reached full appropriation, states have adopted a variety of approaches toward transfers to maintain or augment instream flows. Some state agencies can appropriate, purchase or acquire instream flow rights. Others have designated minimum flow standards for certain streams, while other western states have made provisions to protect them. Only a few states allow private parties and state agencies to acquire instream flows. Alaska, and Arizona permits private parties to hold instream water rights. California's water code allows for appropriative rights holders to dedicate pre-existing water rights to instream purposes. [113] Colorado and Washington let private parties donate instream rights to the State. Laws in Alaska, California, Colorado, Idaho, Montana, Nebraska and Nevada also provide for federal agencies to seek instream flows.

Some states have limited the ability for private parties to purchase instream flows for fear of speculative profits upon resale to a more valuable, consumptive use. There are also concerns that purchase of instream flows might hinder desirable development. Such speculation could be curbed in two different ways: first, by requiring that instream flows purchased are donated to public resource agencies to maintain; and secondly, by submitting future transfer proposals to agency review and approval. Analysts suggest that allowing private purchase of instream water

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[113] No permits had been transferred to instream purposes at the date of this writing. One major impediment identified by the California State Water Resources Control Board is the problem of enforcing instream dedications against downstream users. Telephone conversation with Roger Johnson, Assistant Chief, Division of Water Rights, State Water Resources Control Board (Jan. 3, 1995).

rights would complement public agencies' instream flow efforts without public expense and develop information on the market value of instream uses.

Economic theory suggests that expanding the market to include all potential purchasers would assist in ensuring that water goes to its highest economic use over time. The collective willingness to pay by those who enjoy instream flows could theoretically be expressed by the market price. But the "free rider" problem can break down the market value in yielding efficient resource allocations: that is, instream waters can be enjoyed by users who do not pay the price for it. Instream flows can provide benefits to many at no more cost than to provide it to one. They thus qualitatively vary from consumptive forms of water use. Instream benefits cannot be captured and sold. Instead, these public goods tend to be provided "only by private philanthropy (usually in suboptimal quantities) or by the public sector, which would finance their provision from general revenues."[114]

Working on this "free rider" problem, researchers have generated evidence on public willingness to pay for recreational opportunities and wildlife preservation which instream waters provide. Non-market valuation approaches can be divided into two categories: inferential valuation and contingent valuation.

Inferential approaches use data on actual purchase and consumption of marketed goods and services to infer the value of a non-market resource (e.g., collecting data on expenses incurred to enjoy recreational experience to infer the value of that experience, or comparing values of lake-side property with similar properties without water access). This method is routinely used in cost-benefit analyses performed by many public agencies.

Contingent valuation does not require a conceptual link between market prices and non-market resource values. It requires research on the direct value of a resource in hypothetical or experimental situations, such as iterative bidding or creation of temporary experimental markets, which reveal the value of a given amenity under test conditions.

Western states are now using sales comparisons,[115] income capitalization,[116] analysis of land differentials between parcels with and without water,[117] and "least-cost" alternative

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[114] A. Randall, Resource Economics: An Economic Approach to Natural Resource and Environmental Policy (1987). The example most frequently cited for a private philanthropic organization purchasing instream flows is the Nature Conservancy.

[115] The sales comparison approach compares specific water rights with similar rights sold recently.

[116] The net income capitalization approach analyses the steam of net benefits a particular water right will generate over time and converts the net benefit stream into a value estimate.

analyses[118] to value water and water rights. In addition, some work has been done in ranking the significance of various kinds of impacts on environmental resources and values, as experienced in reservoir, irrigation and hydroelectric projects sites. Rather than assigning economic values to environmental amenities, this approach attempts to measure the relative impacts of development on the environmental resources and values.

The non-market valuation approaches provide only rough estimates of the true value of various uses, and these figures should be taken as indicators rather than as exact numbers.[119] However, they amply illustrate that significant values are associated with instream use in today's society. Moreover, they suggest that prices for free market transfers significantly under-represent some of the highest valued uses of water.

The real value of non-market valuation techniques for the water manager concerns overall implications of the public interest in water transfers. To some extent, the loss of alternative uses (opportunity cost) and negative impacts (externalities) associated with water transfers can be incorporated into market analysis under a centralized authority's use of non-market valuation to estimate water values in alternative uses. Ultimately, however, determining base instream flows unavailable for transfer may be easier than attempts to assess economic values of instream uses. For example, it may be easier to impose minimum stream requirements than to determine the trade-off values between particular instream and diversionary uses of water on a case-by-case basis.

E. How Should Water Conservation and Efficiency Matters Be Handled so as to Free

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[117] Land value differentials require comparisons of agricultural land with or without access to water. The approach depends on the quantity and reliability of market sales data available.

[118] The least-cost alternative approach estimates the cost of creating a water supply similar to the water right being value. It assumes that the costs of alternatives to market acquisition of water rights are related to the price an organization seeking new supplies would be willing to pay for an existing right in a market transaction. This is a valid assumption only if there is evidence that water users in the area would be or have been willing to pay these costs to obtain water supplies. This is generally considered a technique of last resort for valuing water rights, since it is not necessarily related to willingness to pay for water rights or to the net benefits generated by water supplies.

[119] Using indirect valuation techniques, approximate values have been generated for the relative value of water under various kinds of uses. Researchers estimate that the market value of water in irrigation averages less than $40 per acre-foot in about 80% of its uses. For hydropower, the value of water averages about $600 per acre-foot. For household uses, water has been valued at about $200 per acre-foot. Topping the list, recreational instream uses have been valued at between $700 and $1100 per acre-foot. L. MacDonnell, *Shifting the Uses of Water in the West: An Overview, in* Moving the West's Water to New Uses: Winners and Losers 8 (1990).

Up Water for Transfer?

Formerly, water conservation meant water storage or impoundment. Today, as increasing supplies reach natural, political and economic limits, conservation is acquiring new meanings. Conservation now focuses on reducing water use. Conservation can thus free up water to move to more highly valued uses. Transfers can thus in a sense promote overall water efficiency.

Given the tie between conservation and transfers in a variety of contexts, the following discussion first looks at conservation water pricing. It next looks at various states' attempts to foster conservation at the state level. These materials support the conclusion that conservation is not likely to occur spontaneously, even if disincentives to conserve are removed. Incentives to conserve must be provided, or disincentives for the failure to conserve must be designed, if conservation of water resources is to be achieved on a meaningful scale so as to provide water for transfer to meet society's changing demands.

i. Market Approaches to Conservation: Water Pricing

Water pricing can be used as a means to free water resources for transfer to new uses. Historically, water rates that decline with use have been used to attract industry and promote water use for revenue gain. This practice obviously discourages efficient use of water resources. Recent figures from the American Water Works Association's industry data base show that "40% of the utilities surveyed nationwide have declining block rates and 44% use a uniform pricing structure -- only 16 percent use conservation pricing schemes."[120] Although water demand is relatively inelastic,[121] properly drafted conservation pricing schemes will encourage voluntary conservation and efficiency of use. The result will be to reduce water demand and increase revenue, by requiring heavy water users to pay a higher price for excess demand.

Most of the reported work in this area has been associated with large water utility systems.[122] Although the approaches which work well for large systems may differ from those which work for small systems, a "feebate" program can foster conservation if it:

- has a rate structure designed to be revenue neutral (i.e., not produce too much profit), based solely on the utility's costs to produce, treat, and distribute water;
- allocates or entitles users to a given amount of water each month, where the total

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[120] *Cited in* Jeffrey Jordan, *Conservation Water Pricing*, National Rural Water Ass'n (Summer 1994) at 38 (reprinted from Opflow, Vol. 20 No. 4 (1994)).

[121] Inelastic goods are important goods for which few (if any) substitutes exist; thus, the demand will not decrease linearly as price increases.

[122] John E. Regner, "Reducing the Cost of Water," *in* 78 J. AWWA 6 (1986).

amount allocated equals the total available supply;

- assesses surcharges or penalties if users take more than the allocated amount. Rebates may be granted if consumers use less than the allotted amount. Fees and rebates can be flexibly priced based on seasonal water supply and demand.[123]

To encourage water conservation in irrigation, water use cost factors may be adopted which bring into proximity the increased crop output per measure of additional water usage and water's scarcity value. In other words, the pricing is designed to reward farmers for using the level of water that provides the best yield for the least amount of water. The policy would probably require formulation of mechanisms to return to farmers (or other conservers) some part of the savings captured via pricing structures. State, local or federal government could provide additional incentives to collaborate in programs to enhance efficiency. State priorities could be established to help assess program goals, such as establishing favored crops, etc. Similar results can be achieved with pricing structures for hydropower utilities. By instituting price structures that price peak demand electricity at higher levels, peak demand can be curbed. This helps diminish the water demand at peaking power reservoirs, freeing management for fisheries and downstream users.[124]

Successful results of water pricing systems have been demonstrated. Spalding County Water Authority in Georgia instituted an increasing rate pricing structure in 1991. Most customers continued to pay the same rates, but large users now pay higher rates. That year, the Authority added 6% new customers and water use went up by only 1%. At the same time, per customer water use dropped 5%, while total revenue increased 21%.[125] Similarly, during the California drought of 1977, the Marin Municipal Water District offered conservation incentive pricing, and its customers used only 35% of their usual demand.[126] Southern Nevada's major water purveyors have also instituted conservation pricing schemes, resulting in some water savings, though not enough to meet projected future demand.[127]

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[123] *See* Robert Collinge, "Optimal Conservation by Municipal Water Customers: A Revenue Neutral Feebate System," Proceedings of Conserv 93: The New Water Agenda 707-717 (American Water Works Ass'n 1993).

[124] Implementing water pricing for irrigation systems entails practical difficulties, such as metering and the development of efficient and equitable pricing mechanisms, which are beyond the scope of this paper.

[125] *See* J. Jordan, "Conservation Water Pricing," supra at 39.

[126] H. Carter, *et al.*, Sharing Scarcity: Gainers & Losers in Water Marketing 5 (1994).

[127] Letter from Janet Frasier Rogers, Chair of the Colorado River Commission of Nevada, to Craig Bell, Executive Director of the Western States Water Council (October 3, 1994).

ii. Legislative Approaches to Encourage Conservation and Transfers

Four western states have legislated conservation incentives to encourage irrigators to reduce water usage and make water available for other purposes: California, Oregon, Washington and Montana. The following discussion looks at these laws and their results.[128]

a. California Water Conservation and Transfers

California was the first state to enact laws providing incentives to conserve water and transfer it from irrigation to other uses. The state's water code allows conserved water to be "sold, leased, exchanged, or otherwise transferred pursuant to any provision of law relating to the transfer of water or water rights, including, but not limited to, provisions of law governing any change in point of diversion, place of use, and purpose of use due to the transfer."[129] It defines "water conservation" as "the use of less water to accomplish the same purpose or purposes of use allowed under the existing appropriative right." Conservation is defined as a beneficial use of water; hence, failure to put conserved water to use does not result in forfeiture of that right.

Since the conservation legislation was enacted in 1982, California rights holders have made only limited application for the transfer incentives provided under the law. Certain obstacles have been identified. One concerns the "reasonable use" definition needed to quantify the conserved water available for transfer. This provision is being tested by an irrigation district which implemented conservation improvements in its conveyance system, and now claims that conserved water should revert to the district. The Fish and Game Department claims that previous losses violated the state's constitutional requirement prohibiting waste of the state's water resources.[130] The Water Resources Control Board is reviewing available data and will determine the amount the district can use.

Another obstacle has been the view that water for transfer must exceed districts' needs; therefore, unused surface water reallocated for district ground water recharge has been seen as unavailable for transfer. 1992 legislation clarifies this by authorizing transfers "whether or not the water proposed to be transferred is surplus to the needs within the service area of the water supplier."[131] It also authorizes transfers made available by "conservation or alternate water

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[128] This material is primarily derived from L Morandi, "Rethinking Western Water Policy: Assessing the Limits of Legislation," National Conference of State Legislatures (1994).

[129] Cal. Water Code Chapter 867 section 1011 (enacted in 1982).

[130] The California Constitution, article X section 2, provides that the "general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that waste and unreasonable use or unreasonable method of use of water be prevented."

[131] Calif. Water Code Chapter 481, section 1745.

supply measures taken by individual water users or by the water supplier."

The most noted achievement involving conserved water to date has taken place in California. An agreement involving conserved water was reached between Imperial Irrigation District (IID) and the Municipal Water District of Southern California (MWDSC).[132] The MWDSC is a water wholesaler serving California's largely urbanized South Coast region, the part of the state where there is the greatest imbalance between available water supply and projected future demands. Although MWDSC does develop minor local water supply (e.g., ground water, or waste water reclamation), most of its supply comes from imports from the State Water Project and the Colorado River. MWDSC has been pursuing additional sources of supply in response to the region's rapid population growth and expected reduction in availability of Colorado River supplies as neighboring states take more of their Colorado River allotments. Other significant California users of Colorado River water are Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), and Palo Verde Irrigation District (PVID), all located in California's southeastern corner. These districts receive their supplies through USBR's All American Canal System, which includes the 80-mile All American Canal and the 123-mile Coachella Canal. As originally constructed in the 1930s and 1940s, most of the canal system was unlined.

In 1988, Congress enacted PL 100-675, authorizing Interior to line 28 miles of the All American Canal and 38 miles of the Coachella Canal, with the funding to be provided by one or more of the California local agencies--MWDSC, IID, CVWD, or PVID. The approximately 100 TAF of water to be saved by canal lining would be available for use by the local agencies. MWDSC and IID negotiated an agreement in 1993 covering part of this canal lining program, and have been working with USBR on environmental documentation for the project.

Also in 1988, MWDSC and IID signed a water conservation agreement under which MWDSC would contribute over $200 million to implement specified Imperial Valley conservation projects, and to pay for their operations and maintenance costs over a 35-year period. The conserved water would be available for MWDSC's use over the time period of the agreement. Specified conservation projects included canal lining, construction of small reservoirs and canal spill interceptors, installation of new gates and distribution system automation equipment, and on-farm management of irrigation water. Additionally, MWDSC and PVID signed an agreement for a two-year fallowing program (1992-94), under which MWDSC would fund PVID to fallow about 22,000 acres of land each year and would receive the approximately 93 TAF per year generated by fallowing. MWDSC, USBR, and CVWD have further collaborated on a test program for Coachella Canal lining.

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[132] California Department of Water Resources, California Water Plan Update, Bulletin 160-93 (October 1994).

b. Oregon's Conservation Legislation

In 1987, as briefly discussed in an earlier section of the report, Oregon enacted laws providing incentives for irrigation districts and other water users to conserve and reallocate water, to encourage its highest and best use.[133] It requires the Water Resources Commission to approve water conservation plans prior to transfer of water saved. Conserved water receives a priority of one minute after the original water right's priority. The original appropriator retains the right to 75% of the conserved water, while the remainder is transferred to instream flows with the original priority date. It promotes three important public values.[134] First, it assures a reasonable level of certainty about property rights. Second, it encourages conservation of an increasingly scarce resource. Third, it allocates water to its natural channels.

Despite the incentives, only a few applications had been received and no plans or transfers had been approved by mid-1994. Reasons cited for this inactivity include: lack of water-use records to compare actual water conserved with amount diverted; uncertainty over the definition of "irretrievably lost" water subject to transfer; irrigators' fear of losing flexibility in water use and disfavor toward instream flow rights; and inadequate public financing for water conservation facilities. The bill was amended in 1993 to address some of these concerns. Importantly, the definition of "conservation" was amended to apply to "the amount of water *diverted* to satisfy an existing beneficial use. . . ." rather than the amount "consumed or irretrievably lost." While the new definition may adversely affect downstream users who have been dependent on return flows, it makes it easier to evaluate the amount of water available for reallocation. It established that 25% of conserved water reverts to the state.

c. Washington's Trust Water Rights Program

Washington's state trust water rights program is designed to allow for transfers of conserved water to the state, as well as other forms of transfer such as dry year lease options, and gift or purchase of water rights. No transfers have taken place under this program to date. This program is discussed under section III B, "Experience to Date."

d. Montana's Conservation Incentives

In 1991, Montana passed a water salvage statute designed to "make water available for

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[133] Or. Rev. Stat. 537.455 *et seq*. Conservation is defined as "reduction of the amount of water consumed or irretrievably lost in the process of satisfying an existing beneficial use achieved either by improving the technology or method for diverting, transporting, applying or recovering the water or by implementing other approved conservation measures."

[134] Points from J. Harbison, Waist Deep in the Big Muddy, Land and Water Law Rev. 535 (1991).

beneficial use from an existing valid appropriation through the application of water-saving methods." It authorizes a water-rights holder who salvages or conserves water to retain the right to the salvaged water. The water may be transferred, but its use for any purpose or place other than that associated with the original appropriation is subject to approval by the Department of Natural Resources and Conservation.[135]

No water had been conserved for reallocation under this statute until the state's water-leasing statute offered an incentive for an irrigation district and the Department of Fish, Wildlife and Parks. Drought caused the agricultural community to pressure the state to protect fisheries under a leasing program instead of supporting an instream flow bill. The leasing law lets the department "lease existing rights for the purpose of maintaining or enhancing streamflows for the benefit of fisheries."[136] Lease rights are limited to amount historically consumed.

The salvage and leasing statutes together enabled an irrigation district to change from flood irrigation to a more efficient sprinkler system. An irrigator with senior water rights is leasing salvaged water to the department to maintain a seasonal base flow in a creek to benefit a cutthroat trout spawning ground. A second lease with the district stipulates an annual shut down to create flushing flows down the creek for newly hatched trout. Without the lease or other beneficial use, the irrigator and irrigation district would lose the unused portion of their water rights under the abandonment statute. The lease provides a market for salvaged water in ensuring a long-term supply for fishery maintenance.

F. How Should the Effects of Out-of-Basin Transfers Be Compensated?

Since most western water is used in agriculture, most transfers proposals involve rural-to-urban transfers. Beyond the loss of water and crops directly impacted by such transfers, three additional types of impacts on the agricultural economy have been identified:

- "backward linkages" can occur when reduction in crop acreage reduces demand for inputs such as labor, machinery and fertilizer;
- "forward linkages" can occur when a reduction in crop outputs reduces the availability of inputs to other production processes such as food processing and feedlots. These cannot be assessed generally under the methodology of input-output analysis;

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[135] Mont. Code Ann. 85-2-409.

[136] Mont. Code Ann. 85-2-436(2)(a).

- "multiplier effects" can occur when reduced incomes in any sector lead to reduced consumption demands for outputs from other sector, creating ripple effects throughout the economy, reducing income by more than the original decrease.[137]

Studies of transfers from agricultural to urban areas found that, while historical and future transfers appear to do little economic harm state-wide, they can have significant impacts in rural communities of the area of origin, which must be considered a cost of the transfers.[138] Negative impacts are much more severe in rural areas with pre-existing high levels of unemployment and little opportunities for re-employment outside of agricultural sectors. When water is moved beyond an area of origin, the area experiencing the benefits may in no way correspond to the area suffering the costs. Rural areas which exhibit long-term unemployment patterns will incur significant privately borne financial and psychological costs. These differential impacts may be even greater if recipients of payments for water do not reinvest their money in new activities in the region.

If out-of-basin transfers are to become an important means of meeting new water demands, states will need to carefully study the issue of impacts on the area losing water, and formulate acceptable means of adequately compensating areas whose livelihood depends upon the water currently received.

V. CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER ACTION

A. Recommendations

The trend toward increasing numbers of water transfers is unmistakeable, given the fixed limits and nearly full allocation of western water resources.[139] The potential for water transfers to accomplish the societal goals demanded in today's modern society is promising. However, several difficulties with facilitating transfers remain. First, legal impediments exist, some of which may be outdated and no longer necessary. Secondly, there is a substantially broadened array of interests recognized as being affected by water transfers. Thirdly, transfers may result in

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[137] *From* C. Howe & J. Lazo, *Economic and Social Impacts of Agricultural-to-Urban Water Transfers: The Arkansas Valley of Colorado*, Moving the West's Water to New Uses: Winners and Losers (1990).

[138] *Id.*

[139] *See* B. Colby, *Sources of Water I: Agriculture -- The Deep Pool?*, Moving the West's Water to New Uses: Winners and Losers (1990)(noting that data on applications filed for water rights transfers in seventeen western states from 1963 to 1982 indicated a substantial increase in transfer applications over the twenty-year period).

undesirable social and environmental consequences. While recognizing that these difficulties may vary from state-to-state, as well as the appropriate approaches to resolve them, several recommendation have been advanced by various authors, based on the premise that the most optimal process will consist of an integration of water marketing with governmental oversight and approval. The most prevalent of these recommendations are summarized as follows.

i. Guidelines to Improve the Availability of Water for Transfer:

1. Provide guidelines and/or regulations for municipalities and other water users relative to water pricing and fees;

2. Review and revise as appropriate the duty of water for various consumptive uses;

3. More fully utilize existing prohibitions on waste where overall net benefits would accrue as a result;

4. Allow the transfer of conserved or salvaged water. This may involve revision of state abandonment and forfeiture statutes.

ii. Guidelines to Streamline the Transfer Process

1. Review and revise as appropriate laws governing water supply and user organizations for provisions unnecessarily impeding water transfers (e.g., boundary limits on transfers, undefined discretion in districts to prevent transfers).

2. Find ways to reduce transaction costs associated with transfers. For example, the no-injury standard could be defined to exclude de minimus levels of impairment and injury to the water right holder. Injury could be held to prevent transfers only when terms and conditions cannot be established that would adequately offset the injury or provide satisfactory compensation.

iii. Guidelines to Protect the Public Interest in Water Transfers

As transfers become increasingly more frequent and recognizing the broader set of interests impacted by transfers, states may wish to define and/or refine public interest criteria to assure that the relevant interests are considered in the transfer process. In determining what decisions and/or conditions protect the public interest, particular attention should be paid to out-of-basin transfers. To assist in this process, states could develop information on the impacts of proposed transfers from agricultural to urban areas and to environmental uses, and methods for compensating agricultural areas for loss of water and attendant economic losses, as well as political and social problems that may result. An overarching goal should be to recognize and appropriately support sustainability, both economically and environmentally.

iv. Other recommendations

In addition to the above recommendations, the following further steps to encourage transfers have been proposed.

1. Help provide incentives for innovative reallocation schemes, such as water banks to facilitate transfers, together with appropriate waivers of state law to avoid adverse effects where transfers are temporary. Also, the dry-year water lease approach should be encouraged in many cases. In the context of providing water for instream flows through such dry-year leases, the state could take a proactive role in identifying funding entities willing to contribute funds, develop pilot water leases in appropriate basins, provide educational materials and develop suitable arrangements for cooperation with relevant federal agencies.

2. Federal agencies should be encouraged to review and clarify their rules and procedures governing their role in water transfers. Such clarification should lead to a better understanding of respective roles regarding federally constructed storage facilities, and may lead to cooperative agreements incorporating the notion of reservoir capacity sharing and appropriate incentives for conservation[140]

B. The Lessons Learned: Experience-to-date

Most of the above recommendations have been pursued in one or more states in the West. Transfer experience to date in the western states leads to a number of conclusions.

1. Water marketing should continue to be integrated with governmental oversight and approval, to overcome market limitations associated with transaction costs and availability of information, and to ensure equity and efficiency in the reallocations process.

2. Voluntary transfers are preferable to involuntary transfers. In order to foster voluntary transfers, states could help to provide clear assurances to rights holders of the consequences of various forms of transfer and help parties overcome transaction costs of arranging and implementing water transfers, and offer incentives for desirable forms of transfers.

3. Planning processes can provide water administrators with the information required to help avoid undesirable third-party and environmental effects.

4. Aspects of the beneficial use doctrine and the role of forfeiture and abandonment may need to be refined to maximize facilitation of water transfers.

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[140] *See* n.50, *supra.*