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## A Bibliographic Pathfinder on Water Marketing

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## **A Bibliographic Pathfinder on Water Marketing**

Western water management is in a state of transition. Robust economic, industrial and tourism development, urban population growth and changing attitudes about environmental water needs have created additional demands for water. There is simply not enough water available to satisfy this new thirst. The normal flows of most western rivers are fully allocated and groundwater resources in many areas are limited and unable supply water for these new needs. Based on increasing demand and limited supply, western water management is evolving from a supply development paradigm to one of demand management. Under a demand management plan water is reallocated from existing to new uses.

Water transfers are a common component of the demand management paradigm. Transfers, defined as a voluntary change in ownership, point of diversion, or place or purpose of use, can serve different purposes in water management, but fundamentally they involve the reallocation of existing supplies to new and often higher valued uses. Water marketing is a variation of a transfer.

The growing acceptance of water transfers and water marketing has been mirrored by a growth in the economic, legal and water planning literature. This bibliographic pathfinder is a research guide to books, journal articles, technical reports and conference proceedings that address issues raised by water transfers. As a considerable number of publications are included in the pathfinder, the bibliography is organized into six major issue areas. Each issue area begins with a short introductory statement followed by the bibliographic entries listed alphabetically by first author's last name.

Many publications deal with two or more issues but in general the source is listed in only one section. Although this bibliographic pathfinder seeks to capture the important and relevant economic, legal and planning literature, it is not exhaustive, nor does it reference political, social, or biological science sources.

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## I. REALLOCATIONS AND TRANSFERS

Although long authorized under the prior appropriation doctrine, transfers are one of the most debated topics in western water law today. At least seven benefits have been attributed to water transfers. In addition to providing a new source of water supply to growing cities, transfers are justified as (1) a tool to manage drought, (2) a means to provide water for environmental and recreational needs, (3) a way to promote efficient water use, (4) a way to encourage conservation, (5) an alternative to new reservoir construction and (6) a means to promote political and social harmony. The following literature generally documents transfer benefits and offers specific exemplars of those benefits.

### 1. Transfer Benefits

Owen Anderson & Pauline Simmons, *Reallocation, in* WATERS AND WATER RIGHTS 234–428 (Robert Beck ed., 1991).

John H. Davidson, *Emerging Issues in Western Water Transfers*, 13 J. AGRIC. TAX'N & L. 73 (1991).

Leo Eisel, *The Role of Engineering in the Age of Water Reallocation*, in A.L.I.-A.B.A. COURSE OF STUDY: WESTERN WATER LAW IN THE AGE OF REALLOCATION 175 (March 1991) (Cosponsored by the University of Arizona College of Law).

Ernest Flack, *Meeting Future Water Requirements Through Reallocation*, 59 J. AM. WATER WORKS ASS'N 1340 (1967).

GENERAL ACCOUNTING OFFICE, *WATER TRANSFERS: MORE EFFICIENT WATER USE POSSIBLE, IF PROBLEMS ARE ADDRESSED* (1994).

GEORGE GOULD, *RECENT DEVELOPMENTS IN THE TRANSFER OF WATER RIGHTS* (1990) (A.B.A. Annual Water Law Conference).

L. HARTMAN & D. SEASTONE, *WATER TRANSFERS, ECONOMIC EFFICIENCY, AND ALTERNATIVE INSTITUTIONS* (1971).

HIGGINSON-BARNETT CONSULTANTS, *WATER RIGHTS AND THEIR TRANSFER IN THE WESTERN UNITED STATES, REPORT TO THE CONSERVATION FOUNDATION* (1984).

WELLS HUTCHINS, TRANSFER OF WATER RIGHTS, SELECTED PROBLEMS IN THE LAW OF WATER RIGHTS IN THE WEST 385 (1942).

Jay Lund & Morris Israel, *Water Transfers in Water Resource Systems*, 121 J. WATER RESOURCES PLAN. & MGMT. 193 (1995).

LAWRENCE MACDONNELL, WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS (1990) (University of Colorado School Of Law Natural Resources Law Center).

Lawrence MacDonnell, *Transferring Water Uses in the West*, in A.L.I.-A.B.A. COURSE OF STUDY: WESTERN WATER LAW IN THE AGE OF REALLOCATION 29 (March, 1991) (Cosponsored by the University of Arizona College of Law).

LARRY MORANDI, REALLOCATING WESTERN WATER: EQUITY, EFFICIENCY AND THE ROLE OF LEGISLATION 3 (1988) (National Conference of State Legislatures).

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

NATIONAL RESEARCH COUNCIL, WATER TRANSFERS IN THE WEST (1992).

MARC REISNER & SARAH BATES, OVERTAPPED OASIS: REFORM OR REVOLUTION FOR WESTERN WATER (1990).

MARC REISNER, CADILLAC DESERT (1986).

JOSEPH SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 212—44 (1991).

Simms & Davis, *Water Transfers Across State System* 31 ROCKY MTN. MIN. L. INST. 22-1 (1985).

DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES 5-1 to 5-104 (1997).

Gary Weatherford & Steven Shupe, *Reallocating Water In The West*, 78 J. AM. WATER WORKS ASS'N 63 (1986).

## 2. Transfer Methods

Ironically, current water transfers change past allocation practices and at the same time continue past practices. Transfers may be permanent or temporary and occur along a continuum from an outright sale of a permanent water right to the lease of water. Transfer transactions are limited only by the imagination and ingenuity of the parties and include; (1)

dry-year option [contingent] contracts on right to use water, (2) spot market transfers, (3) sale of reclaimed, conserved or surplus water, (4) subordination agreements, (5) water banks, (6) water ranching, (7) institutional transfers, (8) exchanges, and (9) wheeling of stored water. Most of these are described in the literature that follows.

W.P. Balleau, *Water Appropriation and Transfer in a General Hydrologic System*, 28 NAT. RESOURCES J. 269 (1988).

David B. Bush, *Dealing for Water in the West: Water Rights as Commodities*, 80 J. AM. WATER WORKS ASS'N 30 (1988).

ELIZABETH CHECCHIO, *WATER FARMING: THE PROMISE AND PROBLEMS OF WATER TRANSFERS IN ARIZONA* (1988) (University of Arizona Water Resources Research Center, Issue Paper #4).

Bonnie Colby et al., *Transferring Water Rights in the Western States: A Comparison of Policies and Procedures*, in RESEARCH REPORT SERIES (1989) (University of Colorado School of Law, Natural Resources Law Center).

Brian Gray, *Temporary Transfers of Water: A Case Study of California*, in A.L.I.-A.B.A. COURSE OF STUDY: WESTERN WATER LAW IN THE AGE OF REALLOCATION 103 (March 1991) (Cosponsored by the University of Arizona College of Law).

Morris Israel & Jay Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES J. 1 (1995).

John Musick, *Reweave the Gordian Knot: Water Futures, Water Marketing and Western Water Mythology*, 35 ROCKY MTN. MIN. L. INST. 57 (1990).

Steven Shupe et al., *Western Water Rights: The Era of Reallocation*, 29 NAT. RESOURCES J. 413 (1989).

Mark Tader, *Reallocating Western Water: Beneficial Use, Property and Politics*, 1986 U. ILL. L. REV. 277 (1986).

Dan Tarlock, *New Water Transfer Restrictions: The West Returns to Riparianism*, 27 WATER RESOURCES RES. 987 (1991).

Dan Tarlock, *From Reclamation To Reallocation of Western Water*, 46 J. SOIL & WATER CONSERVATION 122 (1991).

Sergio Viscoli, *The Resource Conservation Group Proposal to Lease Colorado River Water*, 31 NAT. RESOURCES J. 887 (1991).

Gary Weatherford, *Water Transfers and Exchanges: Using the Market to Improve Water Use - A Legal and Institutional View*, in WESTERN WATER: EXPANDING USES/FINITE SUPPLIES (1986) (University of Colorado School of Law, Natural Resource Law Center, Seventh Annual Summer Program).

### 3. Agricultural Transfers

Historically, farmers have made extensive use of transfers to obtain water for irrigation. There are numerous examples of water transactions between farmers, mutual irrigation companies and governmental water districts throughout the western states. Mutual irrigation companies are typically nonprofit associations whose customers (ranchers, farmers and irrigators) are also their shareholders, while water districts are governmental entities with elected boards not unlike other local governments. According to Barton Thompson (see *infra* Institutional Considerations) institutions supply, on average, water for about half of the irrigated acreage in the western states.

The new pattern of agricultural transfers involves shifting water from agricultural to urban, industrial and environmental uses. According to Solley (*infra* this section) agriculture utilizes about 80 percent of western water withdrawn for use and is a prime source for reallocation to urban uses. This trend has important implications for agriculture and economic development in many western states.

Raymond Lloyd Anderson, *The Irrigation Water Rental Market: A Case Study*, 13 AGRIC. ECON. RES. 54 (1961).

*California Water Transfers: Gainers And Losers In Two California Counties*, THE AGRICULTURAL ISSUES CENTER & THE WATER RESOURCES CENTER CONF. PROC. (1993) (Davis, California).

Gardner Delworth et al., *Transfer Restrictions and Misallocations of Irrigation Water*, 50 AM. J. AGRIC. ECON. 556 (1968).

Ariel Dinar & J. Letey, *Agricultural Water Marketing, Allocative Efficiency, and Drainage Reduction*, 20 J. ENVTL. ECON. & MGMT. 210 (1991).

Chennat Gopalakrishnan, *The Economics of Water Transfers*, 32 AM. J. ECON. & SOC. 395 (1973).

George Gould, *Conversion of Agricultural Water Rights to Industrial Use*, 27 ROCKY MTN. MIN. L. INST. 1791 (1981).

Jack Houston & Norman Whittlesey, *Modeling Agricultural Water Markets for Hydropower Production in the Pacific Northwest*, 11 W. J. AGRIC. ECON. 221 (1986).

Charles Howe et al., *The Economic Impacts of Agriculture-to-Urban Water Transfers on the Area of Origin: A Case Study of The Arkansas River Valley in Colorado*, 72 AM. J. AGRIC. ECON. 1200 (1990).

L. Jacobi & R. Carley, *Ag-to-Urban Water Transfers in California: Win-Win Solutions*, in WATER MANAGEMENT IN THE 90'S, 332-36 (May 1993) (Proceedings of the Water Resources Planning and Management Division of the American Society of Civil Engineers, Seattle, Washington).

J. Letey & Ariel Dinar, *Water Marketing Effects on Crop-Water Management*, 43 CAL. AGRIC. 15-16 (1989).

RONALD LITTLE & THOMAS GREIDER, *WATER TRANSFERS FROM AGRICULTURE TO INDUSTRY: TWO UTAH EXAMPLES* (June 1983) (Utah State University Institute For Social Science Research On Natural Resources Monograph #10).

M. Rosen & R. Sexton, *Irrigation Districts and Water Markets: An Application of Cooperative Decision-Making Theory*, 69 LAND ECON. 39 (1993).

Stephen Smith, *The Rural-Urban Transfer of Water in California*, 1 NAT. RESOURCES J. 64 (1961).

Rodney Smith, *Water Transfers, Irrigation Districts and the Compensation Problem*, 8 J. POL'Y ANALYSIS & MGMT. 446 (1989).

Rodney Smith & R. Vaughan, *Irrigation Districts: Obstacles to Water Marketing*, AM. WATER WORKS ASS'N J. 10 (March 1988).

SOLLEY, WAYNE ET AL., U.S. DEP'T OF INTERIOR GEOLOGICAL SURVEY DIV., *ESTIMATED USE OF WATER IN THE UNITED STATES IN 1990* (1994).

Walker, Wynn & Gaylord Skogerbee, *An Implicit Approach to Pricing Agricultural Water Transfers to Urban Uses*, 11 WATER RES. BULL. 751 (1975).

Wong, Benedict & Wayland Eheart, *Market Simulations for Irrigation Water Rights: A Hypothetical Case Study*, 19 WATER RESOURCES RES. 1127 (1983).

#### 4. Federal Water Transfers

The federal government, operating principally through the Bureau of Reclamation (Bureau) and the Army Corps of Engineers (Corps), stores and distributes large quantities of water and has the potential to shape the future of western water transfers. While federal laws recognize the states' primacy in the allocation [reallocation] of water rights the complex relationships between federal water agencies, the state water agencies, state-established water and irrigation districts, mutual irrigation districts and individual water users represents a barrier to water transfers. Basically, if a water user with a contractual right to receive Bureau or Corps water seeks to transfer that water or right to another, the transfer would be subject to federal, state and local review. While the law may tilt in favor of state law governing transfers, federal project managers retain substantial discretion in determining whether to approve transfers under their physical control. The literature speaks to the need for institutional clarification favoring water transfers.

BUREAU OF RECLAMATION, VOLUNTARY WATER TRANSACTIONS CRITERIA AND GUIDANCE (1989).

Richard Collins, *Voluntary Conveyance of the Right to Receive a Water Supply from the United States Bureau of Reclamation*, 13 ECOLOGY L.Q. 773 (1987).

John M. Dunn, *Marketing of Surplus Water from Federal Reservoirs*, 13 LAND & WATER L. REV. 835 (1978).

Brian Gray et al., *Transfers of Federal Reclamation Water: A Case Study of California's San Joaquin Valley*, 21 ENVTL. L. 911 (1991).

Mark Kanazawa, *Pricing Subsidies and Economic Efficiency: The Bureau of Reclamation*, J.L. & ECON. 205 (1993).

LAWRENCE MACDONNELL ET AL., FACILITATING VOLUNTARY TRANSFERS OF BUREAU OF RECLAMATION SUPPLIED WATER (July 1991) (University of Colorado School of Law Natural Resources Law Center Final Report Vol. 1 & 2).

John Merrifield, *The Federal Interest in Flexible Interstate Water Allocation in the Southwest*, in WATER AND THE FUTURE OF THE SOUTHWEST 201 – 12 (Z. Smith ed., 1989).



Joseph Sax, *Selling Reclamation Water Rights: A Case Study in Federal Subsidy Policy*, 64 MICH. L. REV. 13 (1965).

Dan Tarlock, *From Reclamation to Reallocation of Western Water*, 46 J. SOIL & WATER CONSERVATION 122 (1991).

RICHARD WAHL, *MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS AND THE BUREAU OF RECLAMATION* (1989).

Zach Willey & Tom Graff, *Federal Water Policy in the United States – An Agenda for Economic and Environmental Reform*, 13 COLUM. J. ENVTL. L. 325 (1988).

## 5. Indian Reservation Transfers

In 1908, the United States Supreme Court ruled in *Winters v. United States*, 207 U.S. 564 (1908) that when Indian reservations were established, sufficient water was implicitly reserved to fulfill the purposes of the reservation. Where Indian reserved rights exist, they are incorporated into the state water law hierarchy with the priority date from the date of creation of the reservation. In many instances, Indian tribes hold unquantified reserved rights for water that predate many rights held by non-Indians under the states' appropriation laws. Thus, Indian reserved rights are the most senior and the most valuable, and the leasing of these rights may provide significant economic benefits to the reservation.

The legal authority of tribes to lease (transfer) their *Winters* water off the reservation is murky and unclear. While federal legislation confirming tribal rights to sell or lease water would resolve such questions, federal trust obligations suggest that federal approval would still be required on a case-by-case basis.

Comment, *Leasing Indian Water Off the Reservation: A Use Consistent with the Reservation's Purpose*, 76 CAL. L. REV. 179 (1988).

David Getches, *Management and Marketing of Indian Water: From Conflict to Pragmatism*, 58 COLO. L. REV. 515 (1988).

Leaphart, *Sale and Lease of Indian Water Rights*, 33 MONT. L. REV. 226 (1972).

Owen Olpin, *Indian Water Rights Transfers*, in A.L.I.-A.B.A. COURSE OF STUDY: WESTERN WATER LAW IN THE AGE OF REALLOCATION 139 (March 1991) (Cosponsored by the University of Arizona College of Law).

Jack Palma, *Considerations and Conclusions Concerning the Transferability of Indian Water Rights*, 20 NAT. RESOURCES J. 91 (1980).

Judith V. Royster, *A Primer on Indian Water Rights: More Questions than Answers*, 30 TULSA L.J. 82 (1994).

Lee Storey, *Leasing Indian Water Off the Reservation: A Use Consistent with the Reservation's Purpose*, 76 CAL. L. REV. 179 (1988).

## II. WATER MARKETING

Water marketing has been a topic since at least 1973 when the National Water Commission recommended the removal of existing legal barriers to water transfers. The literature since then has described the role that market transfers can play in meeting the growing industrial, urban and environmental demands.

Water marketing can be described as a framework and process for transferring water. This process is characterized by voluntary negotiations between the parties over the amount, timing and price of water to be exchanged. Advocates of marketing suggest that the process would allocate water to its highest economic use by allowing those who place the highest economic value on it to buy it. They argue that the specific needs of the purchaser and the seller should dictate the type of transfer sought and the forum through which transfer arrangements are made. In this way property rights are respected and water is reallocated through negotiated purchases rather than through regulatory removal or cancellation. Thus, water marketing is consistent with the current belief that markets are an effective way to allocate scarce resources to meet the tripartite goals of efficiency, equity and conflict minimization.

### 1. Water Marketing Framework

Terry Anderson & Pamela Snyder, *Water Markets: Priming the Invisible Pump* (1998).

Terry Anderson & Peter Hill, *Water Marketing – The Next Generation* (Terry Anderson & Peter Hill, eds. 1997).

Terry Anderson & Donald Leal, *Building Coalitions for Water Marketing*, 8 J. POL'Y ANALYSIS & MGMT. 432 (1989).

Victor Brajer et al., *The Strengths and Weaknesses of Water Markets as They Affect Water Scarcity and Sovereignty in the West*, 29 NAT. RESOURCES J. 489 (1989).

Victor Brajer & Wade Martin, *Allocating a 'Scarce' Resource, Water in the West: More Market-Like Incentives Can Extend Supply, but Constraints Demand Equitable Policies*, 48 AM. J. ECON. & SOC. 259 (1989).

F. Lee Brown & Charles DuMars, *Water Rights and Market Transfers, in WATER SCARCITY: IMPACTS ON WESTERN AGRICULTURE* 408—36 (1984).

Norman Dudley, *Water Allocation by Markets, Common Property and Capacity Sharing: Comparisons or Completions?*, 32 NAT. RESOURCES J. 757 (1992).

Tim De Young & Hank Jenkins-Smith, *Privatizing Water Management: The Hollow Promise of Private Markets, in WATER AND THE FUTURE OF THE SOUTHWEST* 213—31 (Z. Smith ed., 1989).

James Ellis & Charles DuMars, *The Two-Tiered Market in Western Water*, 57 NEB. L. REV. 333 (1978).

FRESHWATER FOUNDATION, *WATER VALUES AND MARKETS: EMERGING MANAGEMENT TOOLS* (1986).

Alison Gregory, *Groundwater and Its Future: Competing Interests and Burgeoning Markets*, 11 STAN. ENVTL L.J. 229 (1992).

Charles Howe et al., *Innovative Approaches to Water Allocation: The Potential for Water Markets*, 22 WATER RESOURCES RES. 439 (1986).

D. Linke, *Water Marketing and Rate Setting for Water for Energy in the Upper Colorado River Basin, in WATER RESOURCES RELATED TO MINING AND ENERGY—PREPARING FOR THE FUTURE* 339—52 (1987) (Proceedings of the American Water Resources Association, Bethesda, Maryland).

CHARLES MEYERS & RICHARD POSNER, *MARKET TRANSFERS OF WATER RIGHTS: TOWARDS AN IMPROVED MARKET IN WATER RESOURCES* (1971) (National Water Commission Legal Study No 18-25).

NATIONAL RESEARCH COUNCIL, *WATER TRANSFERS IN THE WEST* (1992).

BONNIE SALIBA & D. BUSH, *WATER MARKETS IN THEORY AND PRACTICE* (1987).

William Schaab, *Prior Appropriation, Impairment, Replacements, Models and Markets*, 23 NAT. RESOURCES J. 25 (1983).

Paula Smith, *Coercion and Groundwater Management: Three Case Studies and a 'Market' Approach*, 16 ENVTL. L. 797 (1986).

Rodney Smith & Roger Vaughan, *Taking Water to Market*, 57 CIV. ENGINEERING 70 (1987).

Frank J. Trelease, *The Changing Water Market for Energy Production*, 5 J. CONTEMP. L. 83 (1978).

Zach Wiley, *Behind Schedule and Over Budget: The Case of Markets, Water and Environment*, 15 HARV. J.L. & PUB. POL'Y 391 (1992).

Richard Young, *Why Are There so Few Transactions Among Water Users?*, 68 AM. J. AGRIC. ECON. 1143 (1986).

## 2. Western State Marketing Efforts

A growing body of literature documents the potential for water marketing on a state-by-state basis. Most of these articles examine the economic, institutional, legal, and technical factors needed to support marketing in a particular state.

AGRICULTURAL ISSUES CENTER, UNIVERSITY OF NORTHERN CALIFORNIA, *WATER TRANSFERS: GAINERS AND LOSERS IN TWO NORTHERN COUNTIES* (1993) (Davis, California).

Terry Anderson, *The Market Alternative for Hawaiian Water*, 25 NAT. RESOURCES J. 893 (1985).

Chan Chang & Ronald Griffin, *Water Marketing as a Reallocative Institution in Texas*, 28 WATER RESOURCES RES. 879 (1992).

Delworth Gardner, *The Untried Market Approach to Water Allocation*, in *NEW COURSES FOR THE COLORADO RIVER* 155 (Gary Weatherford & F. Lee Brown eds., 1986).

Brian Gray, *A Primer on California Water Transfer Law*, 31 ARIZ. L. REV. 743 (1989).

Ronald Griffin & Fred Boadu, *Water Marketing in Texas: Opportunities for Reform*, 32 NAT. RESOURCES J. 265 (1992).

Joel Hamilton et al., *Interruptible Water Markets in the Pacific Northwest*, 71 AM. J. AGRIC. ECON. 63 (1989).

M. Holburt et al., *Water Marketing in Southern California*, 80 J. AM. WATER WORKS ASS'N 38 (1988).

J. Jones, *California-Nevada Water Marketing Issues*, in HYDRAULICS/HYDROLOGY ARID LANDS 118–23 (1990).

RONALD KAISER, TEXAS WATER RESOURCES INSTITUTE, LEGAL AND INSTITUTIONAL PARAMETERS FOR WATER MARKETING IN TEXAS (1994) (TR NO. 167).

Ronald Kaiser, *Texas Water Marketing in the Next Millennium: A Conceptual and Legal Analysis*, 27 TEX. TECH L. REV. 181 (1996).

Kevin O'Brien, *Water Marketing in California*, 19 PAC. L.J. 1165 (1988).

Kevin O'Brien & Robert Gunning, *Water Marketing in California Revisited: The Legacy of the 1987–92 Drought*, 25 PAC. L.J. 1053 (1994).

Bonnie Saliba, *Do Water Markets 'Work': Market Transfers and Trade-Offs in the Southwestern States*, 23 WATER RESOURCES RES. ASS'N Q. 1113 (1987).

Andrew Schoolmaster, *Water Marketing and Water Rights Transfers in the Lower Rio Grande Valley, Texas*, 43 PROF. GEOG. 292 (1991).

M. Smith, *Water Market in the Southern Front Range of Colorado*, in INTERNATIONAL AND TRANSBOUNDARY WATER RESOURCES ISSUES 535–42 (1990).

Mark Squillace, *Water Marketing in Wyoming*, 31 ARIZ. L. REV. 865 (1989).

Dan Tarlock, *The Role Of Market Transfers in Accommodation of New Uses: A Case Study of the Truckee Carson Basin*, 1990 ANN. SUMMER PROGRAM PROC. (1990) (University of Colorado School of Law Natural Resources Law Center) (document available on reserve under the name of Professor Ronald A. Kaiser at the Sterling Evans Library at Texas A&M University).

John Thorson, *Water Marketing in Big Sky Country: An Interim Assessment*, 29 NAT. RESOURCES J. 479 (1989).

Thomas Tregarthen, *Water Law in Colorado: Fear and Loathing of the Marketplace*, in WATER RIGHTS: SCARCE RESOURCES ALLOCATION, BUREAUCRACY AND THE ENVIRONMENT 119–36 (T.L. Anderson ed., 1983).

Clifford Villa, *California Dreaming: Water Transfers from the Pacific Northwest*, 23 ENVTL. L. 997 (1993).

Richard Wahl, *Market Transfers of Water in California*, 1 WEST-NORTHWEST J. ENVTL. L. POL'Y & THOUGHT 49 (1994).

Mike Willatt, *Buying and Selling Water Rights in Texas*, 59 TEX. B.J. 628 (1996).

D. Yardas, *Water Transfers and Paper Rights in the Truckee and Carson River Basins*, in INDIAN WATER RIGHTS AND WATER RESOURCES MANAGEMENT 32–42 (1989) (Proceedings of the American Water Resources Association Symposium, Bethesda, Maryland).

### 3. Water Banks and Transfers

A water bank is basically a brokerage institution created for the purpose of pooling surplus water rights for rental or sales to other users. Typically, a bank buys water for a fixed price from voluntary sellers and sells it to users at a higher fixed price. The revenue from the difference in prices is used to cover the bank's administrative and technical costs. Under most banking arrangements, the original water rights holders retain their permanent water right and only sell to the bank the right to use the water.

The California Drought Emergency Water Banks of 1991 and 1992 are the most celebrated examples of banking. In both years, the state acted as the banker and fixed the terms and prices of transfers. Formal water banks have also developed in Texas and Idaho, and bank-like activities occur in Kansas, Colorado and Wyoming.

LLOYD DIXON ET AL., CALIFORNIA'S 1991 DROUGHT WATER BANK: ECONOMIC IMPACTS IN THE SELLING REGIONS (1993) (A Report of the Rand Corporation).

Brian Gray, *The Market and the Community: Lessons from California's Drought Water Bank*, 1 WEST-NORTHWEST J. ENVTL. L. POL'Y & THOUGHT 17 (1994).

Austin Hamre, *Water Banking: Should There Be More Interest?*, 25 COLO. LAW. 97 (1996).

RICHARD HOWITT ET AL., A RETROSPECTIVE ON CALIFORNIA'S 1991 EMERGENCY DROUGHT WATER BANK, REPORT PREPARED FOR THE CALIFORNIA DEPARTMENT OF WATER RESOURCES (1992).

Scott Jercich, *California's 1995 Water Bank Program: Purchasing Water Supply Options*, 123 J. WATER RESOURCES PLAN. & MGMT. 59 (1997).

RONALD KAISER, SOME POTENTIAL ROLES FOR THE TEXAS WATER BANK, REPORT PREPARED FOR THE TEXAS WATER DEVELOPMENT BOARD (1994).

JAY R. LUND ET AL., UNIVERSITY OF CALIFORNIA, RECENT CALIFORNIA WATER TRANSFERS EMERGING OPTIONS IN WATER MANAGEMENT (1992) (Department of Civil and Environmental Engineering Report No. 92-1).

LAWRENCE MACDONNELL ET AL., UNIVERSITY OF COLORADO SCHOOL OF LAW, WATER BANKS IN THE WEST (1994) (Natural Resources Law Center Research Report No. 12).

Lawrence MacDonnell, *Water Banks: Untangling the Gordian Knot of Western Water*, 41 ROCKY MTN. MIN. L. INST. 22 (1995).

L. MINK, WATER BANKING IN IDAHO (1993) (paper presented at Riparian Management: Common Threads and Shared Interests and USDA Forest Service General Technical Report RM-226).

Kevin B. Pratt, *Water Banking: A New Tool for Water Management*, 23 COLO. LAW. 595 (March 1994).

Richard Rigby, *Water Banking in Idaho*, in PLANNING FOR WATER SHORTAGES: WATER REALLOCATION, TRANSFERS AND DROUGHT MANAGEMENT 113 (J. Schaack et al. eds., 1989).

### III. ECONOMIC CONSIDERATIONS IN TRANSFERS

Economic value has been the principal means for establishing resource utility in our society. Values established by market price are used to allocate scarce resources. Western water policy is often criticized for allocating water through nonmarket means without regard to its economic value. As such, water is not used efficiently for its highest economic value. The problem of economic misallocation is further complicated by the federal subsidies for water development projects.

Economic theorists have advocated that water be reallocated by market mechanisms to remedy these inefficiencies. They posit that market mechanisms provide allocation flexibility by allowing those who place a higher economic value on the water to purchase it at its market price. In this way, markets generally generate economically efficient outcomes because they facilitate voluntary trading among users thereby delivering water to those users who put the highest economic value on it.

The literature focuses on (1) the technical and legal predicates for market reallocations, (2) efficiency and equity in allocations, (3) investment and risk assessment, (4) benefit/cost valuation and transactional barriers and costs. It includes theoretical and practical articles as well as those that are positive and pessimistic. Positivists suggest that market mechanisms can reallocate water in an economically efficient manner among irrigation, municipal, industrial, environmental and recreational purposes by letting voluntary transfers determine the highest economic use of water. Pessimists point to market failures, third party impacts and water valuation problems.

Raymond Anderson, *Windfall Gains from Transfer of Water Allotments Within the Colorado-Big Thompson Project*, 43 LAND ECON. 265 (1967).

H. Stuart Burness & James Quirk, *Water Law, Water Transfers and Economic Efficiency: The Colorado River*, 23 J.L. & ECON. 111 (1980).

M. Clinton, *Water Transfers: Can They Protect and Enhance Rural Economies?*, in MOVING THE WEST'S WATER TO NEW USES: WINNERS AND LOSERS (1990) (University of Colorado Natural Resource Law Center Proceedings of the 1990 Annual Summer Program, Boulder, Colorado).

Bonnie Colby et al., *Water Right Transactions: Market Values and Price Dispersion*, 29 WATER RESOURCES RES. 1565 (1993).

Bonnie Colby, *Economic Incentives and Agricultural Drainage Problems: The Role of Water Transfers*, in THE ECONOMICS AND MANAGEMENT OF WATER AND DRAINAGE IN AGRICULTURE 803–20 (A. Dinar & D. Zilberman eds., 1991).

Bonnie Colby, *Transaction Costs and Efficiency in Western Water Allocation*, 72 AM. J. AGRIC. ECON. 1184 (1990).

Bonnie Colby, *Economic Impacts of Water Law – State Law and Water Market Development in the Southwest*, 28 NAT. RESOURCES J. 721 (1988).

B. Colby et al., *Do Water Market Prices Approximately Measure Water Values?*, 27 NAT. RESOURCES J. 617 (1987).

Jan Crouter, *Hedonic Estimation Applied to a Water Rights Market*, 63 LAND ECON. 259 (1987).

Ronald Cummings & Vahram Nercissiantz, *The Use of Water Pricing as a Means for Enhancing Water Use Efficiency in Irrigation: Case Studies in Mexico and the United States*, 32 NAT. RESOURCES J. 731 (1992).



J. Eheart & J. Barclay, *Economic Aspects of Groundwater Withdrawal Permit Transfers*, 116 J. WATER RESOURCES PLAN. & MGMT. 282 (1990).

A. Fischer, *Some Theoretical and Measurement Issues in Economic Assessment of Interbasin Water Transfers*, 2 WATER SUPPLY & MGMT. 137 (1978).

Richard L. Gardner & Thomas A. Miller, *Price Behavior in the Water Market of Northeastern Colorado*, 19 WATER RES. BULL. 557 (1983).

Charles Howe, *Economic Issues Related to Large-Scale Water Transfers in the United States*, 2 WATER SUPPLY & MGMT. 127 (1978).

Charles Howe et al., *Transaction Costs as Determinants of Water Transfers*, 61 U. COLO. L. REV. 393 (1990).

Mark Kanazawa, *Water Subsidies, Water Transfers and Economic Efficiency*, 22 CONTEMP. ECON. POL'Y 112 (1994).

KHOSHAKHLAGH ET AL., *FORECASTING FUTURE WATER MARKET VALUES FOR WATER RIGHTS IN NEW MEXICO* (1977) (New Mexico Water Resources Research Institute Report No. 092).

Tom Kuhnle, *The Federal Income Tax Implications of Water Transfers*, 47 STAN. L. REV. 533 (1995).

Jay Lund, *Transaction Risk Versus Transaction Cost in Water Transfers*, 29 WATER RESOURCES RES. 3103 (1993).

Kathleen Miller, *Right to Use Versus the Right to Sell: Spillover Effects and Constraints on the Water Rights of Irrigation Organization Members*, 23 WATER RESOURCES RES. 2166 (1987).

K. Olson, *Economics of Transferring Water to the High Plains*, 22 Q.J. BUS. & ECON. 63 (1983).

Bonnie Saliba, *Market Transactions and the Pricing of Water Rights in the West*, in *WATER MARKETING: OPPORTUNITIES AND CHALLENGES OF A NEW ERA* (S. Shupe ed., 1986) (University of Denver College of Law and Watershed West).

RODNEY SMITH, *TRADING WATER: AN ECONOMIC AND LEGAL FRAMEWORK FOR WATER MARKETING* (1988) (The Council of State Policy and Planning Agencies, Washington, D.C.).

Wynn Walker & Gaylord Skogerboe, *An Implicit Approach to Pricing Agricultural Water Transfers to Urban Uses*, 11 WATER RESOURCES BULL. 751 (1975).

Frank Ward, *Economics of Water Allocation to Instream Uses in a Fully Appropriated River Basin: Evidence from a New Mexico Wild River*, 23 WATER RESOURCES RES. 381 (1987).

NORMAN K. WHITTLESEY ET AL., ECONOMIC STUDY FOR THE POTENTIAL FOR WATER MARKETS IN IDAHO (1986) (Idaho Water Resources Research Institute Report USGS G1259-02) (document available on reserve under the name of Professor Ronald A. Kaiser at the Sterling Evans Library at Texas A&M University).

#### IV. ENVIRONMENTAL WATER NEEDS

A remarkable new demand for water is for instream and estuary flows that support nonconsumptive environmental and recreational uses. This demand is driven by recreation and tourism which has become a major part of the economy of many western states, rivaling or surpassing agriculture in gross state revenues. Water-based recreational and tourism activities require that a certain amount of water remain in streams and these activities are harmed by consumptive diversions. Marketing and transfer advocates argue that recreational and environmental needs can be satisfied through transfers.

##### 1. Environmental Needs and Marketing

Generally, the prior appropriation doctrine did not consider environmental and recreational uses when much of the water in western stream was allocated. During times of drought this oversight is most apparent as fish and wildlife suffer.

Bonnie Colby et al., *Mitigating Environmental Externalities Through Voluntary and Involuntary Water Reallocation: Nevada's Truckee-Carson River Basin*, 31 NAT. RESOURCES J. 757 (1991).

Bonnie Colby, *Economic Value of Instream Flows—Can Instream Values Compete in the Market for Water Rights*, in INSTREAM FLOW PROTECTION IN THE WEST 87–101 (1989).

Bonnie Colby, *Enhancing Instream Flow Benefits in an Era of Water Marketing*, 26 WATER RESOURCES RES. 1113 (1990).

Jones Crammond, *Leasing Water Rights for Instream Flow Uses: A Survey of Water Transfer Policy, Practices and Problems in the Pacific Northwest*, 26 ENVTL. L. 225 (1996).

T. DeYoung, *Instream Flow Protection in a Water Market State: The Case of New Mexico*, in INSTREAM FLOW PROTECTION IN THE WEST 331 – 56 (1989).

Thomas J. Graff, *Environmental Quality, Water Marketing, and the Public Trust: Can They Coexist?*, 5 UCLA J. ENVTL. L. & POL'Y 137 (1986).

Ronald Griffin & Shin-Hsun Hsu, *The Potential for Water Market Efficiency when Instream Flows Have Value*, 75 AM. J. AGRIC. ECON. 292 (1993).

John S. Harbison, *Waist Deep in the Big Muddy: Property Rights, Public Values, and Instream Waters*, 26 LAND & WATER L. REV. 535 (1991).

Ray Huffaker et al., *Institutional Feasibility of Contingent Water Marketing to Increase Migratory Flows for Salmon on the Upper Snake River*, 33 NAT. RESOURCES J. 671 (1993).

JAMES HUFFMAN ET AL., *THE ALLOCATION OF WATER TO INSTREAM FLOWS: A COMPARATIVE STUDY OF POLICY MAKING AND TECHNICAL INFORMATION IN THE STATES OF COLORADO, IDAHO, MONTANA, AND WASHINGTON* (July, 1980) (Report to the Office of Water Research and Technology).

Marie Livingston & Thomas Miller, *A Framework for Analyzing the Impact of Western Instream Water Rights on Choice Domains: Transferability, Externalities and Consumptive Use*, 62 LAND ECON. 269 (1986).

NORMAN K. WHITTLESEY & J. HOUSTON, *WATER MARKETS FOR STREAM FLOW AUGMENTATION* 139–46 (1984) (Proceedings of a Water Resources Management Symposium, Seattle, Washington) (document available on reserve under the name of Professor Ronald A. Kaiser at the Sterling Evans Library at Texas A&M University).

R. Wigington, *Update on Market Strategies for Protection of Western Instream Flows and Wetlands*, in MOVING THE WEST'S WATER TO NEW USES: WINNERS AND LOSERS (1990) (Proceedings of the Annual Summer Program University of Colorado Natural Resource Law Center).

Paul R. Williams & Stephen J. McHugh, *Water Marketing and Instream Flows: The Next Step in Protecting California's Instream Values*, 9 STAN. ENVTL. L.J. 132 (1990).

## 2. Other Environmental Protection Strategies

An alternative literature tract explores the regulatory approach and the nuances of the public trust doctrine as a means for reallocating water to protect water-based environmental and recreational resources.

Richard Ausness, *Water Rights, the Public Trust Doctrine, and the Protection of Instream Uses*, U. ILL. L. REV. 407 (1986).

Lynda Butler, *Environmental Water Rights: An Evolving Concept of Public Property*, 9 VA. ENVTL. L.J. 323 (1990).

David Hallford, *Environmental Regulations as Water Rights Taking*, 6 NAT. RESOURCES & ENVT. 13 (1991).

John Harbison, *Waist Deep in the Big Muddy: Property Rights, Public Values, and Instream Waters*, 26 LAND & WATER L. REV. 535 (1991).

Ronald Kaiser & Sharon Kelly, *Water Rights for Texas Estuaries*, 18 TEX. TECH L. REV. 1121 (1987).

RONALD KAISER & SHARON KELLY, PROTECTING FRESHWATER INFLOWS INTO TEXAS ESTUARIES: AN EVALUATION OF LEGAL STRATEGIES 131–39 (1986) (Proceedings of the Society of the Agricultural Engineers' National Symposium on Water Resources Law, Chicago, Illinois).

Joseph Kaufman, *An Analysis of Developing Instream Water Rights in Oregon*, 28 WILLAMETTE L. REV. 285 (1992).

## V. INTERBASIN TRANSFERS

One approach to providing water in areas of limited supply is to physically transfer water from one watershed to another. This is cryptically termed the engineering approach because of the extensive infrastructure needed to move the water. Interbasin transfers have been a common means of augmenting supply through the United States. For example, New York City gets part of its municipal water from the Delaware Basin, Denver from the Colorado River Basin and Los Angeles from the Sacramento and San Joaquin River Basins. Since these large-scale interstate transfers evoke substantial political and legal controversy they have limited viability for meeting the new water needs. Smaller intrastate transfers have been more commonplace and may have some potential.

Because of the possible severe effects on the economy, ecology, culture, lifestyle and potential future growth in the originating basin most

states have established "area-of-origin" protection requirements. These statutory safeguards increase transfer costs and may impose substantial barriers to transfers.

### 1. Intrastate Transfers

Robert Abrams, *Interbasin Transfer in a Riparian Jurisdiction*, 24 WM. & MARY L. REV. 591 (1983).

J. Booker & R. Young, *Modeling Intrastate and Interstate Markets for Colorado River Water Resources*, 26 J. ENVTL. ECON. & MGMT. 66 (1994).

William Cox & Leonard Shabman, *Virginia's Water Law: Resolving the Interjurisdictional Transfer Issue*, 3 VA. J. NAT. RESOURCES L. 181 (1984).

C. Dosi & M. Moretto, *Interbasin Water Transfers Under Uncertainty: Storage Capacity and Optimal Guaranteed Deliveries*, 4 ENVTL. & RESOURCE ECON. 331 (1994).

Kenneth Easter & N. Becker, *Interbasin Water Transfers: An Economic Panacea or a Political Ploy*, 55 J. MINN. ACAD. SCI. 154 (1989).

Donald L. Hey, *River Response to Interbasin Water Transfers: Craig Goch Feasibility Study*, 85 J. HYDROLOGY 407 (1986).

James Hite, *Interbasin Water Transfers in Riparian Doctrine States: The Case of Interregional Compensation*, 17 GROWTH & CHANGE 10 (1986).

CHARLES HOWE & WILLIAM EASTER, *INTERBASIN TRANSFERS OF WATER: ECONOMIC ISSUES AND IMPACTS* (1971).

Corwin Johnson & Larry Knippa, *Transbasin Diversion of Water*, 43 TEX. L. REV. 1035 (1965).

R. JOHNSON, *LEGAL ASPECTS OF MAJOR INTERBASIN TRANSFERS* (1971) (National Water Commission Legal Study No 7) (document available on reserve under the name of Professor Ronald A. Kaiser at the Sterling Evans Library at Texas A&M University).

James Kundell, *Interbasin Water Transfers in Riparian States: A Case Study of Georgia*, 24 WATER RESOURCES BULL. 87 (1988).

M. L'vovich & N. Koronkevich, *Geographic Approaches to Study of the Effect of Interbasin Water Transfers on Natural Conditions*, 10 WATER RESOURCES 556 (1983).

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

LAWRENCE MACDONNELL ET AL., GUIDELINES FOR DEVELOPING AREA-OF-ORIGIN COMPENSATION (1985) (Colorado Water Resources Research Institute Report No. 139).

DEAN E. MANN, INTERBASIN WATER TRANSFERS: A POLITICAL AND INSTITUTIONAL ANALYSIS (1972) (National Water Commission Report No. NWC-Sbs-72-037).

P. Micklin, *Inter-Basin Water Transfers in the United States*, in LARGE SCALE WATER TRANSFERS; EMERGING ENVIRONMENTAL AND SOCIAL EXPERIENCES 37–65 (1985).

Jarret C. Oeltjen & Richard S. Harnsberger et al., *Interbasin Transfers: Nebraska Law and Legend*, 51 NEB. L. REV. 87 (1971).

Kent Olsen, *Prospects for Interbasin Water Transfer in the Southwest*, in WATER AND THE FUTURE OF THE SOUTHWEST 179–99 (Z. Smith ed., 1989).

Ronald Robie & R. Kletzing, *Area of Origin Statutes—The California Experience*, 15 IDAHO L. REV. 419 (1979).

E. Roy Tinney, *Criteria for Analysis of Interregional Transfers of Water*, 58 J. AM. WATER WORKS ASS'N 1369 (1966).

L. Trotta, *Inventory of Interbasin Water Transfers in Minnesota*, in WATER-USE DATA FOR WATER RESOURCES MANAGEMENT 93–105 (1988) (Proceedings of the American Water Resources Association Symposium, Bethesda, Maryland).

Albert Utton, *The Transfer of Water from an International Border Region: A Tale of Six Cities and the All-American Canal*, 16 N.C. J. INT'L L. & COM. REG. 477 (1991).

Henry Vaux & Richard Howitt, *Managing Water Scarcity: An Evaluation of Interregional Transfers*, 20 WATER RESOURCES RES. 785 (1984).

## 2. Interstate Transfers

Arthur Chan, *Outline of a Three Stage Policy of Interstate Groundwater Allocation that Promotes Equity, Efficiency and Orderly Development*, 26 LAND & WATER L. REV. 149 (1991).

Arthur Chan, *To Market or Not to Market: Allocation of Interstate Waters*, 29 NAT. RESOURCES J. 529 (1989).

Robert Currey-Wilson, *Do Oregon's Water Export Regulations Violate the Commerce Clause?*, 16 ENVTL. L. 963 (1986).

Connie L. Eaton, *Commerce Clause Scrutiny of Montana's Water Export Statutes*, 7 PUB. LAND L. REV. 97 (1986).

Lewis M. Francis, *The Utah Water Exports Act*, UTAH L. REV. 339 (1992).

Allen D. Freemyer & Craig M. Bunnell, *Legal Impediments to Interstate Water Marketing: Application to Utah*, 9 J. ENERGY L. & POL'Y 237 (1989).

Stephen Frerichs & William K. Easter, *Regulation of Interbasin Transfers and Consumptive Uses from the Great Lakes*, 30 NAT. RESOURCES J. 561 (1990).

Darcy Frownfelter & Dan Tarlock, *State Groundwater Sovereignty after Sporhase: The Case of the Hueco Bolson*, 43 OKLA. L. REV. 27 (1990).

David Guy, *When the Law Dulls the Edge of Chance: Transferring Upper Basin Water to the Lower Colorado River Basin*, 1991 UTAH L. REV. 25 (1991).

Richard Harnsberger, et al., *Interstate Transfers of Water: State Options after Sporhase*, 70 NEB. L. REV. 754 (1991).

Charles Howe, *Economic, Legal, and Hydrologic Dimensions of Potential Interstate Water Markets*, AM. J. AGRIC. ECON. 1226 (December, 1985).

Ann Berkley Rodgers, *The Limits of State Activity in the Interstate Water Market*, 21 LAND & WATER L. REV. 357 (1986).

G. SHERK, CONTROLS OVER INTERSTATE TRANSFERS OF GROUND WATER POST-SPORHASE: STATE AND FEDERAL OPTIONS 187-93 (1984) (Proceedings of National Water Well Association Western Regional Conference on Groundwater Management, Worthington, Ohio).

Barton Thompson, *Interstate Transfers: Sporhase, Compacts, and Free Markets*, in A.L.I.-A.B.A. COURSE OF STUDY: WESTERN WATER LAW IN THE AGE OF REALLOCATION 79 (March 11, 1991) (Cosponsored by the University of Arizona College of Law).

## VI. LEGAL AND INSTITUTIONAL CONSIDERATIONS IN WATER TRANSFERS

A water right acquired under the prior appropriation doctrine is a vested property right entitled to protection against interference from other water users. The ability of an appropriator to transfer the legal priority to use a quantity of water is a valuable property right recognized by all appropriation states. This transfer right is not absolute but is qualified. The transfer may not injure other water rights holders. The "no injury rule" is the only universal restriction on transfers.

### 1. Legal Considerations

Some states have imposed additional restrictions on transfers. One is the area-of-origin restriction that limits the transfer of water between watershed within the state. Unlike the "no injury rule," interbasin transfer restrictions are intended to safeguard the needs of communities and regions and not just those of other water users. State restrictions designed to discriminate against out-of-state transfers are constitutionally suspect as impermissible burdens on interstate commerce.

A more recent restriction on transfers is the public interest review. While the practice varies from state to state, interest reviews require scrutiny of the transfer to protect public values and to internalize the external cost associated with the transfer. This public interest rubric provides the basis for evaluating third-party impacts associated with transfers.

Steven Clyde, *Drafting Purchase and Sale Agreements Affecting Water Rights*, 3 NAT. RESOURCES & ENV'T 5 (1988).

Steven Clyde, *Adapting to the Changing Demand for Water Use Through Continued Refinement of the Prior Appropriation Doctrine: An Alternative Approach to Wholesale Reallocation*, 29 NAT. RESOURCES J. 435 (1989).

Bonnie Colby et al., *Procedural Aspects of State Water Law: Transferring Water Rights in the Western States*, 31 ARIZ. L. REV. 697 (1989).

William Cox & Leonard Shabman, *Virginia's Water Law: Resolving the Interjurisdictional Transfer Issue*, 3 VA. J. NAT. RESOURCES L. 181 (1984).



N. Coontz, *Water Market Reforms for Water Resource Problems: Invisible Hands or Domination In Disguise?*, in *THE ECONOMICS AND MANAGEMENT OF WATER AND DRAINAGE IN AGRICULTURE* 759–77 (A. Dinar & D. Zilberman eds., 1991).

Ray J. Davis, *Utah Water Rights Transfer Law*, 31 ARIZ. L. REV. 841 (1989).

Charles Dumars & Dan Tarlock, *New Challenges to State Water Allocation Sovereignty*, 29 NAT. RESOURCES J. 331 (1989).

Harrison Dunning, *Reflections on the Transfer of Water Rights*, 4 J. CONTEMP. L. 109 (1977).

Wayland Eheart & Randolph Lyon, *Alternative Structures for Water Rights Markets*, 19 WATER RESOURCES RES. 887 (1983).

B. Delworth Gardner, *Removing Impediments to Water Markets*, 42 J. SOIL & WATER CONSERVATION 384 (1987).

Martha Gilliland et al., *Water and Water Rights Transfers: A New Policy for Nebraska*, 25 WATER RESOURCES BULL. 49 (1989).

George Gould, *Transfer of Water Rights*, 29 NAT. RESOURCES J. 457 (1989).

R. HIGGINSON & J. BARNETT, *WATER RIGHTS AND THEIR TRANSFER IN THE WESTERN UNITED STATES* (1984).

Ronlad N. Johnson et al., *The Definition of a Surface Water Right and Transferability*, 24 J.L. & ECON. 273 (1989).

Tom Kuhnle, *The Federal Income Tax Implications of Water Transfers*, 47 STAN. L. REV. 533 (1995).

A. Lynne Krogh-Hampe, *Injury and Enlargement in Idaho Water Rights Transfers*, 27 IDAHO L. REV. 249 (1991).

Gary Lynne & Phyllis Saarinen, *Melding Private and Public Interests in Water Rights Markets*, 25 J. AGRIC. & APPLIED ECON. 69 (1993).

Lawrence MacDonnell, *Recent Developments in Water Rights Transfers*, in A.L.I.-A.B.A. COURSE OF STUDY: WESTERN WATER LAW IN THE AGE OF REALLOCATION 21 (March 11, 1991) (Cosponsored by the University of Arizona College of Law).

Stuart Somach & Andrew Hitchings, *Antitrust Considerations in Water Marketing*, 11 NAT. RESOURCES & ENV'T 26 (1996).

## 2. Institutional Considerations

Public and private water institutions are an integral part of the appropriation doctrine and today control and distribute most of the surface water in the western states. While the prior appropriation doctrine establishes the allocation rules, institutions supply the water. Because of their pivotal development and supply role, institutional arrangements can facilitate or impede transfers. Any analysis of water transfers restrictions must consider these water brokers.

Steven Clyde, *Legal and Institutional Barriers to Transfers and Reallocation of Water Resources*, 29 S.D. L. REV. 232 (1984).

Charles Dumars, *The State as a Participant in Water Markets: Appropriate Roles for Congress and the Courts*, 21 WATER RESOURCES RES. 1771 (1985).

M. Gisser & R. Johnson, *Institutional Restrictions on the Transfer of Water Rights and the Survival of an Agency*, in WATER RIGHTS: SCARCE RESOURCES ALLOCATION, BUREAUCRACY AND THE ENVIRONMENT 137–66 (T. Anderson ed., 1983).

Richard Howitt, *Empirical Analysis of Water Market Institutions: The 1991 California Water Market*, 16 RESOURCE & ENERGY ECON. 357 (1994).

N. THORSON, ANALYSIS OF LEGAL AND INSTITUTIONAL ARRANGEMENTS AFFECTING WATER ALLOCATION AND USE IN NEBRASKA (July, 1982) (University of Nebraska Water Resources Center).

Barton Thompson, *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671 (1993).

## VII. PUBLIC INTEREST CONSIDERATIONS—THIRD PARTY IMPACTS

Since water supports a wide range of private and public uses, water transfers are not simple transactions between buyers and sellers. Indeed, water transfer can cause a variety of adverse economic, social and environmental impacts on the public and third parties. Existing laws, procedures and institutions may not fully protect the public from these impacts. For example, if agricultural land is taken out of production to transfer water to urban areas negative economic and social impacts can

occur in the rural area. These may include reductions in farm income, dislocation of farm workers, decreases in property tax revenues, a shrinking local tax base and decline in local services. These negative impacts may or may not be offset by similar gains in the urban area.

The literature on third-party impacts is mostly conceptual. Recent studies indicate that most states subject transfers to public interest reviews but the statutes vary considerably regarding specific criteria used and the weight accorded to each criteria. While some protection exists in these reviews serious questions arise as to the scope of protected interests, the extent of protection and how it should be provided.

BAY AREA ECONOMIC FORUM, *WATER MARKETING IN CALIFORNIA: RESOLVING THIRD-PARTY IMPACT ISSUES*, SAN FRANCISCO (1993).

Victor Brajer & Wade Martin, *Water Rights Markets: Social and Legal Considerations: Resource's 'Community' Value, Legal Inconsistencies and Vague Definition and Assignment of Rights Color Issues*, 49 AM. J. ECON. & SOC. 35 (1990).

Lee Brown et al., *Water Reallocation, Market Proficiency, and Conflicting Social Values*, in *WATER AND AGRICULTURE IN THE WESTERN UNITED STATES: CONSERVATION, REALLOCATION AND MARKETS* 191 (Gary Weatherford ed., 1982).

HENRY CARTER ET AL., UNIVERSITY OF CALIFORNIA, *SHARING SCARCITY: GAINERS AND LOSERS IN WATER MARKETING* (1994) (Agricultural Issues Center).

A. Charney & G. Woodard, *Socioeconomic Impacts of Water Farming on Rural Areas of Origin in Arizona*, 72 AM. J. AGRIC. ECON. 1193 (1990).

ELIZABETH CHECCHIO & SUSAN NUNN, *WATER TRANSFERS IN ARIZONA: ASSESSING THE ADVERSE EFFECTS ON AREAS OF ORIGIN* 547-59 (1988) (Proceedings of the American Water Resources Association Symposium, Bethesda, Maryland).

Charles Dumars & M. Minnis, *New Mexico Water Law: Determining Public Welfare Values in Water Rights Allocation*, 31 ARIZ. L. REV. 817 (1989).

S. Eden, *Negotiation as a Strategy for Obtaining Compensation for Areas of Origin in Rural-Urban Transfers*, in *WATER TRANSFERS IN THE SOUTHWEST: EXPLORATIONS* (S. Nunn ed., 1987).

G. Golubev & A. Biswas, *Large-Scale Water Transfers: Emerging Environmental and Social Issues*, in LARGE SCALE WATER TRANSFERS: EMERGING ENVIRONMENTAL AND SOCIAL EXPERIENCES 1-5 (1985).

George Gould, *Water Rights Transfers and Third-Party Effects*, 23 LAND & WATER L. REV. 1 (1988).

Douglas L. Grant, *Public Interest Review of Water Right Allocation and Transfer in the West: Recognition of Public Values*, 19 ARIZ. ST. L.J. 681 (1987).

John S. Harbison, *Waist Deep in the Big Muddy: Property Rights, Public Values, and Instream Waters*, 26 LAND & WATER L. REV. 535 (1991).

Susanne Hoffman-Dooley, *Determining What Is in the Public Welfare in Water Appropriations and Transfers: The Intel Example*, 36 NAT. RESOURCES J. 103 (1996).

John Klein-Robbenhaar, *Balancing Efficiency with Equity: Determining the Public Welfare in Surface Water Transfers from Acequia Communities*, 36 NAT. RESOURCES J. 37 (1996).

Susan Nunn & Helen Ingram, *Information, the Decision Forum, and Third-Party Effects in Water Transfers*, 24 WATER RESOURCES RES. 473 (1988).

Peter Metzger, *Protecting Social Values in Western Water Transfers*, 80 J. AM. WATER WORKS ASS'N 58 (1988).

CY R. OGGINS & HELEN INGRAM, DOES ANYBODY WIN? THE COMMUNITY CONSEQUENCES OF RURAL TO URBAN WATER TRANSFERS: AN ARIZONA PERSPECTIVE (1989) (University of Arizona Udall Center for Studies in Public Policy Issue Paper No 2).

Shannon Parden, *The Milagro Beanfield War Revisited in Ensenada Land & Water Association v. Sleeper: Public Welfare Defies Transfer of Water Rights*, 29 NAT. RESOURCES J. 861 (1989).

K. Pratt, *Mitigating Third-Party Effects*, AM. WATER WORKS ASS'N J. 51 (March 1988).

James Swaney, *Trading Water: Market Extension, Social Improvement or What?*, 22 J. ECON. ISSUES 33 (1988).

Henry Vaux, *Water Scarcity and Gains from Trade in Kern County, California*, in *SCARCE WATER AND INSTITUTIONAL CHANGE* 67–101 (K. Frederick ed., 1986).

Kenneth Weber, *Effects of Water Transfers on Rural Areas: A Response to Shupe, Weatherford and Checchio*, 30 NAT. RESOURCES J. 13 (1990).

Charles Wilkinson, *Public Interest Constraints on Water Transfers*, in *WATER MARKETING: OPPORTUNITIES AND CHALLENGES FOR A NEW ERA* (1986) (University of Denver College of Law and Watershed West).