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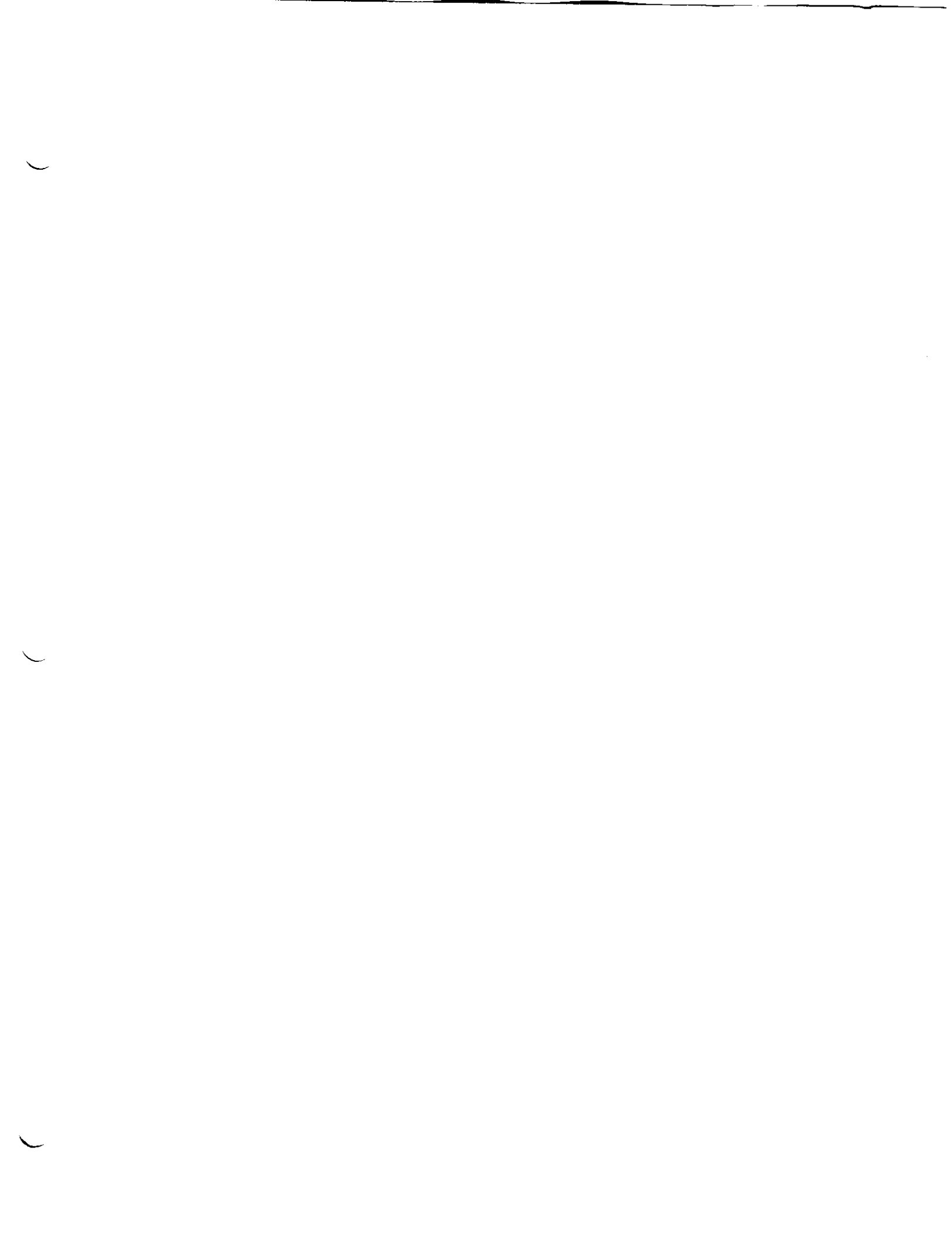
Changing Patterns of Water Use in the West:
Pressures on the System

David H. Getches

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Western Water: Expanding Uses/Finite Supplies

Natural Resources Law Center
University of Colorado School of Law
June 2-4, 1986



- I. The Changing World of Western Water
 - A. Uses and demands for water are changing significantly. Wilkinson, Western Water Law in Transition, 56 Colo. L. Rev. 317 (1985).
 1. The West is urbanizing.
 2. Agricultural demand is stable or declining.
 3. There are growing demands for instream flows to protect fish and wildlife habitat, maintain scenic beauty and provide recreational opportunities. Tarlock, The Recognition of Instream Flow Rights: "New" Public Western Water Rights, 25 Rocky Mtn. Min. L. Inst. 24-1 (1979); Walsh, Sanders and Loomis, Wild and Scenic Rivers Economics: Recreation Use and Presentation Values 71-73 (1985).
 - a. Recreation and tourism is a growth industry.
 - b. Environmental consciousness is stronger than ever.
 - c. The federal government is claiming water for instream flows based on reserved rights.
 4. Water rights for Indian reservations are being quantified. Collins, The Future Course of the Winters Doctrine, 56 Colo. L. Rev. 481 (1985).
 - B. Traditional sources of new supplies are becoming unreliable.

1. Climate is changing in much of the West. Revelle & Waggoner, "Effects of a Carbon Dioxide - Induced Climatic Change on Water Supplies in the Western United States," in Changing Climate: Report of the Carbon Dioxide Assessment Committee, National Academy of Science 419-432 (1983).
 - a. Carbon dioxide increase in the atmosphere is causing warmer temperatures and decreased precipitation.
 - b. Serious reductions in the quantities and quality of water can be expected in most western rivers.
2. Most proposed large water storage projects are becoming infeasible.
 - a. Federal funding for new projects is virtually unavailable.
 - b. Environmental problems prevent development of many sources.
 - c. Most proposed projects cannot be financed with private capital because of unfavorable benefit-cost ratios.
 - d. State and local governments are increasingly cost-conscious in their water project investments. Smith, Troubled Waters: Financing Water in the West (1984).

- e. Evaporative losses are so great from storage of water on many western rivers that further new reservoirs development will not increase firm yield. Hardison, "Potential United States Water-supply Development," Journal of the Irrigation and Drainage Division, American Society of Civil Engineers 479 (1972).
3. Nonrenewable groundwater is being mined and contaminated.
- a. "Fossil water" is potential insurance against drought.
 - b. Supplies are being depleted because of poor management and inadequate laws. Getches, Controlling Groundwater Use and Quality: A Fragmented System, 17 Natural Resources Lawyer 623 (1984); Corker, Inadequacy of the Present Law to Protect, Conserve and Develop Groundwater Use, 25 Rocky Mtn. Min. L. Inst. 23-1 (1979).
 - c. Contamination can render aquifers useless for some or all purposes.
- II. A trend toward more efficient water use is responding to pressures caused by increased demands and finite supplies.
- A. Municipal water demand can be greatly reduced. Easley, Cost Effectiveness of Water Conservation in Meeting Denver's Water Supply Needs (1986).

1. Technology can assist in reducing demand for inhouse uses without impacting lifestyles.
 - a. Plumbing devices.
 - b. Reuse.
2. Great opportunities exist for reducing outdoor uses.
 - a. Although only about half of the water used by a municipal water system is for outdoor uses (lawn watering, car washing, pools) nearly all the consumption of municipal systems is from these purposes. LTW Associates, Water and Growth: An Inquiry Into the Potential Impacts of Municipal Water Use Restrictions Upon Future Growth of the Colorado Front Range Corridor, reprinted in Colorado Department of Natural Resources, Colorado Water Study (draft 1981).
 - b. Low water demand landscaping ("xeriscape") can be very effective.
 - c. Outdoor use of water is price elastic while inhouse use is not very elastic. Gibbons, The Economic Value of Water 9-10 (1985).
3. Systemwide improvements can make water already in the system go farther.

- a. Reuse of secondarily treated sewage for irrigation.
 - b. Recycling of potable treated water.
 - c. Leak detection.
 - d. Pricing -- the most effective tool. See Hanke, "Demand For Water Under Dynamic Conditions," 6 Water Resources Research 1253-1261 (1970); Young, "Price Elasticity of Demand For Municipal Water: A Case Study of Tucson, Arizona," 9 Water Resources Research 1068-1072 (1973); Zamora, Kneese and Erickson, Pricing Urban Water: Theory and Practice in Three Southwestern Cities, 1 Southwestern Review of Management and Economics 89 (1981).
- B. Agriculture, as user of over 90 percent of western water, holds the greatest potential for improvements in efficiency. U.S. Comptroller General, More and Better Uses Could Be Made of Billions of Gallons of Water By Improving Irrigation Delivery Systems GAO CED-77-117 (1977); U.S. General Accounting Office, Better Water Management Possible - But Constraints Need to Be Overcome GAO CED-79-1 (1978); National Water Commission, Water Policies For the Future 227-230 (1973); U.S. Department of the Interior,

Critical Water Problems Facing the Eleven Western States (1975); U.S. Water Resources Council, The Nation's Water Resources 1975-2000.

1. Great reductions in use may be made through technology (ditch lining, laser leveling of fields, computer scheduling, moisture sensing, drip irrigation, gated pipe, etc.). See U.S. Office of Technology Assessment, Water-related Technologies For Sustainable Agriculture in U.S. Arid/Semi-Arid Lands (1983); E.g., U.S. Department of Agriculture Soil Conservation Service, Onfarm Irrigation Improvements -- McElmo Creek Unit Salinity Control Study (1983).
2. Better management of water within a basin through exchanges and cooperation can greatly increase the usability of existing sources within a prior appropriation system. Colorado Water Resources Research Institute, A Voluntary Basinwide Water Management: South Platte River Basin Colorado (1984); Howe, Schurmeier and Shaw, Innovations in Water Management: Lessons From the Colorado-Big Thompson Project in Northern Colorado Water Conservancy District in Scarce Water and Institutional Change (Frederick, ed. 1986).

3. Low water demand crops and conservation tillage can increase yields and use the same or less water. See Lacewell and Collins, Implications and Management Alternatives For Western Irrigated Agriculture, Technical Article 17807 of the Texas Agricultural Experiment Station (nd.).
 4. Reuse or sale of salvaged water can stretch existing supplies. See Pring and Tomb, License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West, 25 Rocky Mtn. Min. L. Inst. 25-1 (1979).
- C. Municipal supplies can be expanded through innovative arrangements with agricultural users.
1. Municipalities can finance water conservation measures that otherwise would be beyond the economic reach of agriculture.
 - a. Imperial Irrigation District-Metropolitan Water District Proposal.
 - b. Casper-Alcova transaction.
 2. Contractual arrangements such as dry year leases can provide drought security for municipalities without extinguishing agricultural uses.
 3. Physical solutions such as exchanges and augmentation plans allow greater uses of the same sources without any reduction in use. See

Dunning, "The Physical Solution" in Western Water Law, Colo. L. Rev. 57:3 (1986).

- D. Instream flows and natural values can be protected in an efficient system.
 - 1. Fewer diversion and impoundment facilities need to be built.
 - 2. Care must be taken to assure that wetlands are not drained and streams dried up in the name of efficiency.
- E. The requisites of an efficient water allocation system should be;
 - 1. Water must have an ascertainable value.
 - 2. Water must be freely transferable.
 - 3. The system must address environmental problems.
 - 4. The system must deal with equities.

III. Economics plays the most important role in achieving efficient water use.

- A. Market transfers of water can move the resource to the uses most important to society. Howe, Schurmeier and Shaw, Innovative Approaches to Water Allocation: A Potential For Water Markets 22 Water Resources Research 439 (1986); Wahl and Osterhoudt, Transactions in Water (Review Draft 1985).
 - 1. There is a great disparity in values of agricultural uses and municipal uses.

2. Much western water is locked in low-value uses, possibly preventing some desirable development and certainly increasing costs of new supplies.
- B. The wisest choices among possible sources of water are the least cost alternatives.
- C. There are several barriers to market transfers.
1. Legal impediments to transferring of water exist in many states. Pring and Tomb, supra.
 2. Transaction costs required for transfer of water rights or changes of use often drive the expense of the transaction beyond the value of the water.
 3. Psychological and social barriers to transfers are great.
- D. Uncritical reliance on the market is misplaced.
1. People do not always behave rationally, especially where water is concerned.
 2. Short-run profits may not be in the best long-run interests of the public.
 - a. Social issues, such as dislocations caused by removing water from one part of the economy or one part of the state to others, may not be addressed by the market.
 - b. The interests of unborn generations are not well reflected in the marketplace.

- c. Environmental protection is not automatically assured in a water market.
 - 3. Instream flows for public use are unlikely subjects of free market transactions without government intervention or regulation.
- IV. What is the role of government in promoting efficient water use in a prior appropriation state?
 - A. State government should facilitate transfers.
 - 1. Remove barriers to transfers.
 - a. Outright prohibitions.
 - b. Obstacles such as excessive transaction costs.
 - 2. Define water rights.
 - 3. Protect equities. See generally Ingram, Scaff and Silko, Replacing Confusion With Equity: Alternatives For Water Policy in the Colorado River Basin, in New Courses for the Colorado River 177 (1985).
 - a. Area of origin protections may be necessary, e.g., sinking funds or trust funds to deal with regional economic declines, loss of agricultural heritage, etc.
 - b. The poor should not be denied water for their basic needs.
 - 4. Institutions that discourage transfers should be reformed.

5. Agencies and programs may be created to act as brokers in trading water.
 - a. Idaho water bank.
 - b. Pending legislation in California.
- B. Policies and laws should encourage efficiency.
 1. "Beneficial use" should be defined to allow rights only in the consumption required to achieve the purposes for which water was appropriated in a reasonably efficient manner. Glenn Dale Ranches, Inc. v. Shaub, 94 Idaho 585, 494 P.2d 1029 (1972); A-B Cattle Co. v. United States, 196 Colo. 539, 589 P.2d 57 (1978).
 2. Conjunctive use of groundwater and surface waters is essential. Trelease, Conjunctive Use of Groundwater and Surface Water, 27B Rocky Mtn. Min. L. Inst. 1853 (1982).
 3. Physical solutions, including a requirement that senior water users accept a substitute supply (CRS § 37-80-120, should be encouraged. See Dunning, supra.
 4. Effective pollution controls increase the amount of water that is available.
 5. Pricing policies can discourage excessive use.
 6. States should have a policy against public subsidies for water development except where they are needed to achieve clear social goals.

7. A requirement that least cost alternatives be selected for public water supplies would help overcome the price insensitivity of public agencies. See generally Welsh, How To Create A Water Crisis (1985).
 8. Sale and reuse of salvaged water should be allowed. E.g., Calif. Water C. §§ 382, 383, 1009-1011.
- C. Regulation of water use is needed to protect the value of property rights in water.
1. Pollution control.
 2. Enforcement of rights as against other users is needed to prevent excessive or improper use of water.
- D. Comprehensive planning is essential to efficient use of water and western states.
1. Most western states have largely abdicated their planning function to the federal government.
 2. Planning should not be limited to identifying and setting priorities for water development opportunities; it includes:
 - a. projecting growth patterns.
 - b. predicting per capita use.
 - c. studying and identifying the extent of needs for instream flows.

- d. setting policies for public investment.
 - e. indicating regions of the state where certain water uses will and will not be permitted.
3. Wise public investments require planning.
- E. Institutions that hold water rights and distribute water may have to be reformed.
- 1. Public agencies and entities are able to resist market forces and often make uneconomic decisions.
 - 2. Special water districts often enjoy the benefits of public agencies and of private enterprise without the burdens of either. See generally, Special Project -- Irrigation Districts, 1982 Arizona State Law Journal 345-327.
 - 3. Water courts and administrative agencies build in delays and costs that are unnecessary.
- F. Government participation in markets may be desirable.
- 1. Instream flows are best owned and protected by government entities.
 - 2. State interests must be represented in interstate transactions.
 - a. States have special interests in their future growth and the health and welfare of their citizens.

- b. States cannot absolutely ban water exports. Sporhase v. Nebraska, 458 U.S. 941 (1982); El Paso v. Reynolds, 583 F.Supp. 379 (D.N.M. 1983), 597 F.Supp. 694 (D.N.M. 1984).
 - c. A recent study has concluded that New Mexico should hold and market rights to major sources of groundwater. Water Resources Research Institute and University of New Mexico Law School, State Appropriation of Unappropriated Groundwater: A Strategy For Ensuring New Mexico A Water Future (1986).
 - d. Amendments to Montana law in 1985 provide for the state to be the sole appropriator and lessor of large quantities of water (Mont. Code Ann. § 85-2-205) subject to certain public interest criteria (Mont. Code Ann. § 85-2-311). See Montana Select Committee on Water Marketing, Report to the 49th Montana Legislature (December 1984).
3. The law of equitable apportionment may require states to insist on greater efficiency or else lose a portion of the water to which they are entitled to another state. Colorado v. New Mexico, 459 U.S. 176 (1982); See Grant, The Future of Interstate Allocation of Water, 29 Rocky Mtn.

Min. L. Inst. 977 (1983); Tarlock, The Law of Equitable Apportionment Revisited, Updated, and Restated, 56 Colo. L. Rev. 381, 403-410 (1985).

G. Federal laws and policies must be reformed to allow freer transfer of federal project water and Indian water.

1. Transactions in water from Bureau of Reclamation projects are unnecessarily and artificially restrictive. Ellis and DuMars, The Two-tiered Market in Western Water, 57 Neb. L. Rev. 333 (1978); Sax, Selling Reclamation Water Rights: A Case Study in Federal Subsidy Policy, 64 Mich. L. Rev. 13 (1965).

2. Indian water rights, while largely unutilized, exist in quantities that cast doubt on the value of many private water rights.

3. Questions about transferability of Indian water rights should be resolved by Congress.

V. Conclusion: Western water will be adequate for all foreseeable uses -- primarily municipal growth and instream flows -- without major capital investments if available means of efficient water management and use are applied.